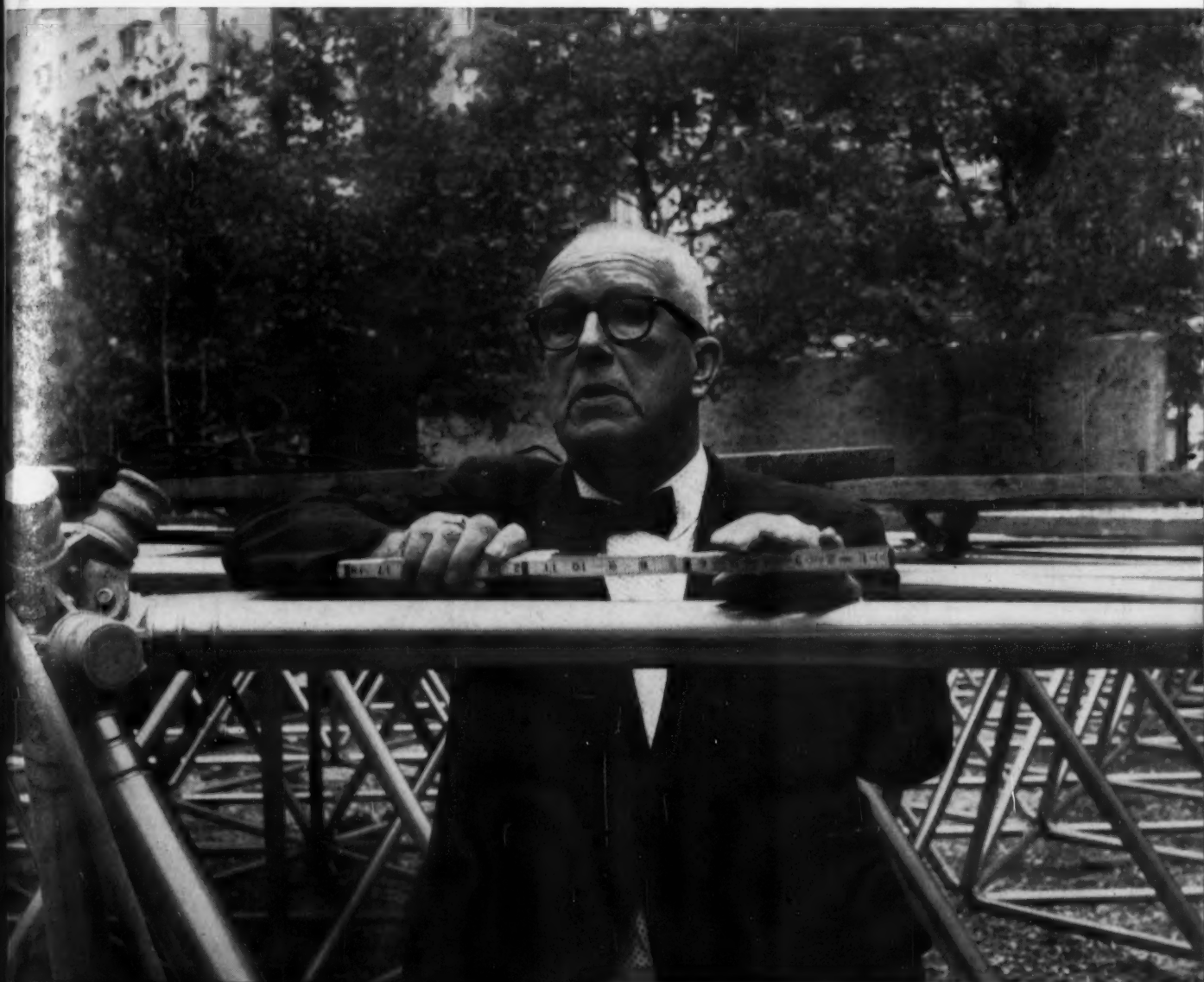


# The IRON AGE

November 12, 1959

A Chilton Publication

The National Metalworking Weekly



R. Buckminster Fuller—

**Bold, New  
Ways to Build  
With Metals P. 117**

**How to Plan For  
Lower Marketing Costs — P. 122**

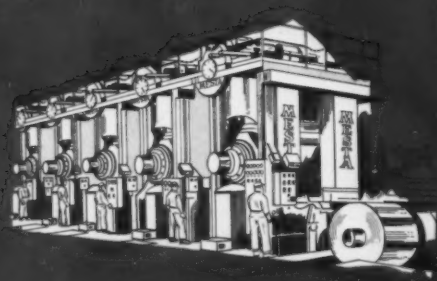
**What Materials Solve  
Re-Entry Problems? — P. 155**

**Digest of the Week — P. 2-3**

# TIN

## SHEARING LINES

*Designed and Built by*  
**MESTA**



MESTA HIGH-SPEED SIDE TRIMMING AND  
SHEARING LINE FOR LIGHT GAUGE STRIP

*Designers and Builders of Complete Steel Plants*

**MESTA MACHINE COMPANY**

PITTSBURGH, PENNSYLVANIA

# Not a New Missile

*it's a special fastener*

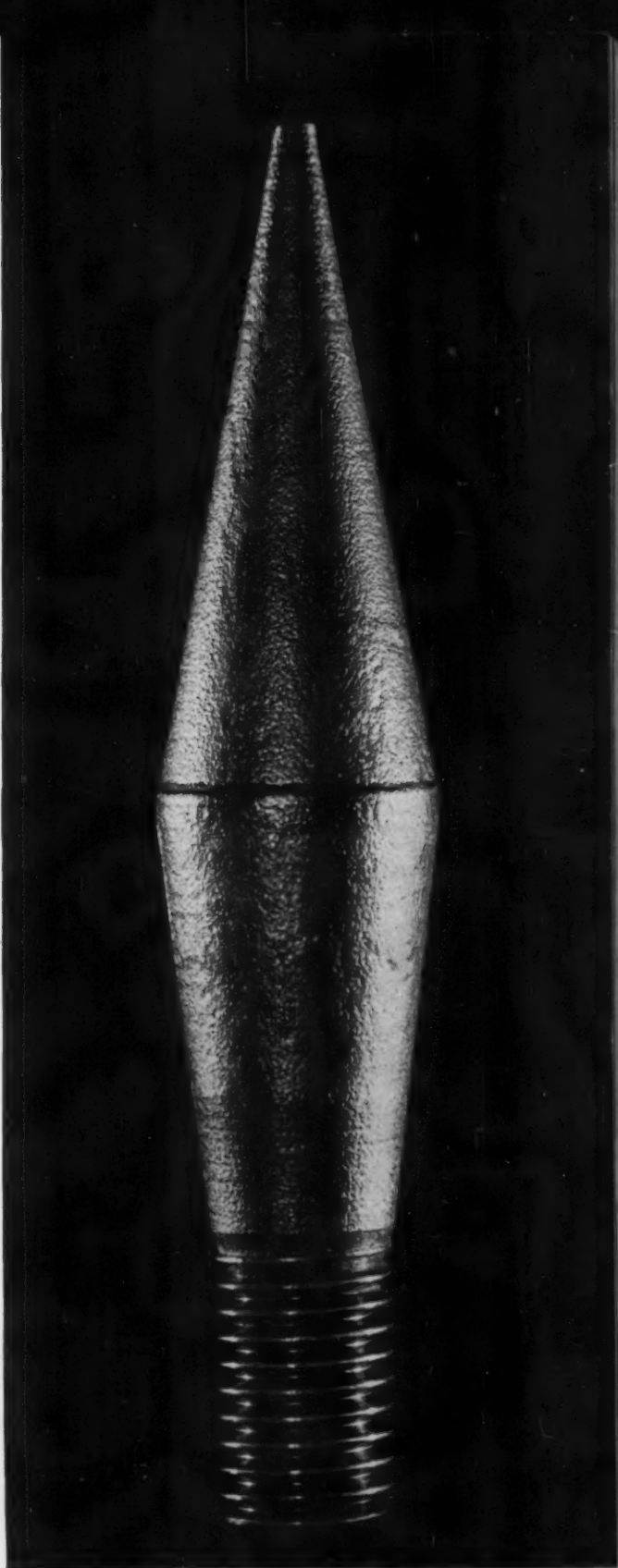
It looks like it's ready to blast-off from Cape Canaveral. But see the threads? They give it away for what it really is—a fastener. And a very special kind, made by Bethlehem.

Our customer uses this special fastener as the point in a grip hook for steam log loaders. It's got to be strong and hard and tough. That's why we hot-forge it from a special alloy steel and heat-treat it. Other manufacturing operations: trimming, descaling, threading.

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# The IRON AGE

November 12, 1959—Vol. 184, No. 20

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**Outlook Gloomy**—Differences between industry and union are as wide as ever. It's hard to see how either side can be persuaded to yield on the principal points. Other industries are also determined to fight unions on the same issues.

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#### REFRACTORY METALS

**Sales Are Booming**—Makers of metals with high melting points are riding the crest of space age demand to record breaking sales.

P. 121

#### ROADBUILDING

**Funds Cut**—Roadbuilders, expecting a period of all-out construction, find that appropriations have been slashed.

P. 124



tion, find that appropriations have been slashed.

P. 124

#### COST CUTS

**Coming Up**—President Eisenhower will ask Congress to make some cuts in government spending

# Metalworking



## COVER FEATURE

**BOLD IDEAS:** The controversial ideas of R. Buckminster Fuller are now called commercially workable by even the most practical designers. They can mean big, new markets for metals. P. 117

(Cover—Aluminium Ltd. photo)

in January. Areas to be hit are defense and foreign aid. P. 137

### KAISER SETTLEMENT

**How It Affects West**—Kaiser Steel agreement with the USWA means some Farwest steel users will get supplies faster than rest of the U. S. Kaiser makes almost 30 pct of the West's steel. P. 139

## FEATURE ARTICLES

### MISSILE PROTECTION

**From Re-Entry Damage**—Re-entry of an ICBM into the atmosphere is "unrelated to any past developments" in technology. Some studies into this problem have been recently declassified. It permits public discussion of some of the details of thermal protection, listing how some materials behave. P. 155

### PIPING SYSTEMS

**Take on New Look**—Flexibility is the key word in a successful piping system, especially if it's efficient. Here's one that is easy to install and takes up much less space. The basic unit in the setup is lightweight welded steel tubing. P. 158

### AID HOT-WORKING

**With Quick Chill**—Die-quenching of jet-age metals reaches a standstill when the die absorbs too much heat. But here's an invention that solves this production bottle-

neck. It's a new die-quenching process that reduces critical cooling time. P. 160

### IMPROVE CLAD METALS

**With Heat Treatments**—How do you heat-treat a clad plate whose constituent metals respond differently? This description of various heat treatments and the properties they impart can serve as a good basic guide. P. 162

### CAVITY SINKING

**Boosts Superalloy Machining**—It takes a lot of machines to form the high-temperature alloys used in missiles and jet engines. And this unit could be just what the program needs. There are no sparks or arcs. P. 166

## MARKETS & PRICES

### COST ANALYSIS

**Hidden Costs**—Distribution cost analysis can cut down hidden marketing costs. Here's how to go about getting your program started. P. 122

## NEXT WEEK

### VALUE ANALYSIS

**Satisfies Customers**—The chief inspector of your product is really the final customer. Next week's technical feature gives a rundown on how Whirlpool Corp. handles this challenge.

### GOOD TIMES

**Healthy Market**—Tool and die-makers are enjoying a good market despite the steel strike. Customers are still buying, even if their plants are closed for lack of steel. P. 125

### AUTOMOTIVE

**Ramblers Rolling**—Even the steel strike isn't hurting the star of the American Motors' stable as Ramblers are still rolling off assembly lines at a record rate. Here are some of George Romney's plans. P. 133

### STEEL SUMMARY

**Rough Market**—When steel starts to move in volume, competition from customers will be the roughest since the post-war period. Little relief is expected for six weeks. P. 205

### STEEL SOURCE

**Used Steel**—Wrecking firms are a source of structurals and other steel that can be re-used. They can be important during the present shortage. P. 206





## Get new-forging performance at 1/3 the cost from **ERIE FOUNDRY REBUILDING SERVICE**

Here at the Erie Foundry Rebuilding "Hospital", we disassemble and inspect your forging hammer, remachine worn surfaces, true bearings, replace broken parts, repair cracked parts. Once the hammer is reassembled, tested and put back in operation, it'll be as spry and sound as a new machine—but at one-third the cost!

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Regardless of who made it, or how badly it's cracked, broken or worn, your forging hammer will recover most quickly at Erie Foundry's Rebuilding "Hospital". Write for the complete story.



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IN FORGING SINCE 1895

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EP-39-02

THE IRON AGE, November 12, 1959

## NEW TECHNIQUE!

In plunging, a refractory basket containing the magnesium additive is plunged into an already filled ladle of iron. Flame and smoke are virtually eliminated. Slag volume is significantly reduced. Magnesium recovery is more consistent. SAVINGS OF UP TO 50% OF ALLOY COSTS ARE BEING REGULARLY OBTAINED.



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If the plunging technique fits your operation, you will be interested in Ohio Ferro-Alloys' special alloy package developed specifically for this technique. Our Sil-Mag alloys are now available in cans containing the exact weight required for specific ladle treatments. The package is designed for insertion directly in the plunger. Possible alloy losses in handling and weighing operations are eliminated. MAXIMUM CONVENIENCE — MINIMUM COST

Write for your copy of our new brochure,  
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ANOTHER ADVANTAGE:  
Pallets holding sixty  
cans for convenient  
handling and storage.

# DUCTILE IRON



PHOTO BY KARSH OF OTTAWA

**"Supplier reliability is a must  
to sound product development"**—R. W. SWANK, Research and Development,  
Smith-Erie Div., A. O. Smith Corp.

"We count Sharon Steel as one of our most dependable suppliers, and this is extremely important to a development engineer," says R. W. Swank, Manager of Research and Development of service station pumps in the Smith-Erie Division of A. O. Smith Corp.

Shown here with P. R. Fishburn, Manager of Manufacturing, Swank points out "If we can design with the knowledge that we need not be concerned about material analysis variation, our jobs are made that much easier. We've found we can expect this kind of supplier reliability from the *Sharon Steel Corporation, Sharon, Pa.*"



**SHARON** *Quality* **STEEL**

# Justice May Be Slow: But It Almost Always Comes

Stalling action of the Steelworkers' union was brought to a halt last week by the Supreme Court. It forthrightly found the Taft-Hartley Law valid.

For more than two weeks the steel union was able to drain off most of the nation's steel inventories by clever legal appeals.

There was some muttering about what "ought to be done." In a democracy the mill of justice may grind slowly, but it protects our rights. So it is well that no one can now say he did not have the benefit of any doubt.

Invocation of Taft-Hartley should have come long before it did. The President's advisers who gave him false hope of imminent settlement, and thus blocked a Taft-Hartley move, are responsible for the nation's plight today.

Fortunately, the steel industry was not caught in a bind. One court ruled in favor of T-H while the other courts heard appeals with a stay order. No one can find any fault whatever with the U. S. District Court, the Appellate Division or the Supreme Court.

The belief that there will be no settlement in the 80 days ahead has nothing to do with the

usefulness of the T-H Act. Congress saw fit to pass it. In the current steel strike it was the only thing on the books to prevent a complete breakdown of the nation's economy.

The effects of the delays, and the strike itself, have been far more serious than either of the principals has been willing to admit. Further, they are far more devastating than many steel users have yet found out.

Experienced market observers and steel sales people have been aghast for weeks at the turn of events. Their feelings and analyses will be confirmed in the weeks to come when many segments of the economy will come to a grinding halt.

Taft-Hartley is no slave law. The sooner the unions recognize this the better. If there is no settlement in steel during the 80 days, and if the men go out again, the crisis in the country will be far worse than it is now.

Steel produced in that period will come far from satisfying even day-to-day requirements—let alone building up supplies.

The next move—if there is no settlement—will come from Congress. Taft-Hartley is giving both sides a last reprieve.

*Tom Campbell*

Editor-in-Chief



## CASE HISTORIES



High-volume N/D precision ball bearing with popular Senti-Seal<sup>®</sup> gives radial arm saw new sales appeal while lowering costs! Bearing is lubricated-for-life for maintenance-free performance.

### **N/D** Ball Bearings Cut Power Saw Production Costs \$30,000 A Year!

#### CUSTOMER PROBLEM:

Manufacturer of popular radial arm power saw sought ways to lower over-all production costs, yet maintain high precision standard.

#### SOLUTION:

N/D Sales Engineer, cooperating with customer engineers, developed and recommended a different rotor and shaft design that maintained original, high motor efficiency. The new design provided for the use of an N/D high-volume precision ball bearing. Savings in bearing costs alone add up to \$30,000 a year!

In addition, the N/D precision ball bearings are

equipped with low torque, performance-proved Senti-Seals<sup>®</sup> which protect precision bearing parts against saw-generated dust. What's more, these N/D bearings are lubricated-for-life . . . they require no periodic maintenance.

If you're looking for ways to cut production costs . . . or ways to add new sales appeal to your product, why not call your New Departure Ball Bearing Sales Engineer? He can probably engineer a cost-saving, high-volume N/D precision ball bearing into your product. Just call or write New Departure Division, General Motors Corporation, Bristol, Connecticut.

® Registered trade mark for New Departure integral spring seal.

Replacement ball bearings are available through United Motors System and its Authorized Bearing Distributors.



**NEW DEPARTURE**  
**BALL BEARINGS**  
*proved reliability you can build around*

## Aluminum Bumpers Coming?

Aluminum bumpers are said to be a possibility for some model 1961 cars. This could also pave the way to consideration of aluminum as a wheel cover material. Problems with respect to aluminum wheel covers are the same as for aluminum bumpers: need for improving luster and durability of anodic coatings; and resolving the improper use of caustic live-steam solutions in automatic car washes. Answers are close.

## Spray With Plasma Flame

Consumers can now buy plasma flame spray guns for use in their own plants. This gun, offered by Metallizing Engineering Co., Inc., will coat surfaces of any material that can be melted without decomposing. Logical materials include columbium and tantalum carbides, tungsten, thorium oxide, and zirconium boride.

## Allows Boron Zone-Melting

Floating-zone melting of boron is no longer a problem. The key is to boil boron granules in boric acid solution. This coats the boron with boric acid and permits forming into suitable shapes for refining; a baking step strengthens the compacts. The technique will provide large crystals for basic research studies of this semiconductor material.

## Weld Titanium Spheres

Hot pressure welding has now been employed in production of titanium spheres. The units are used in missile fuel applications. Pressure requirements range from 8500-10,000 psi in liquid nitrogen. The material used is a high-strength titanium alloy.

## New Casting Alloy

New aluminum casting alloy can be used for advanced missile and aircraft components. According to the developers, it has strength charac-

teristics well into the area of forgings. The addition of beryllium is an important feature of the new alloy. This element helps control embrittlement by modifying iron impurities picked up during melting and casting.

## Exhibit Foreign Machines

Biggest surprise of this year's metal show, observers say, was number and variety of foreign machine tools exhibited. They are being marketed by responsible businessmen, anxious to impress American manufacturers with parts and maintenance service facilities. Coupled with price advantages up to 40 pct, they are a real competitive threat.

## Thermocouple for 4000°F

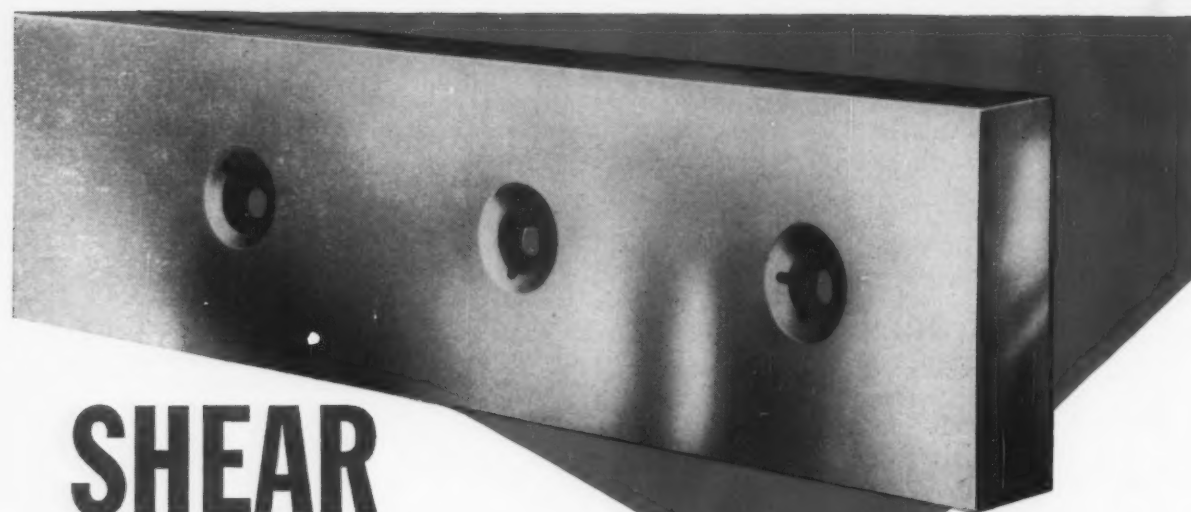
Answering the need for a high-temperature measuring device is a refractory metal thermocouple. Rhenium-tungsten thermocouples have been calibrated for use up to 4000°F. Engineers also point out that rhenium thermocouples are reliable for measuring temperatures in vacuum, hydrogen, or inert atmospheres.

## Flow-Turns Rocket Cases

A giant 250,000-lb flow-turn machine will stretch and shape circular disks and rings of metal into rocket and missile cases for the Pratt and Whitney Aircraft division. According to spokesmen, the machine is designed to flow cylindrical shapes with diameters up to 80 in.

## Rivet With Aluminum

Research indicates that certain high-purity aluminum alloys will fill the bill as fasteners for magnesium-thorium alloys. Sheets of this magnesium alloy are finding wider usage in the aircraft and missiles fields. Dow Metals Products Co. points out that high purity (99.99 pct) aluminum is very compatible with magnesium and that very little galvanic corrosion occurs when they are coupled.



# SHEAR KNIFE

# SLITTER KNIFE

**SIMONDS** Has the Right One for Your Job



If you use SHEAR KNIVES... single or four edge... there's a Simonds Shear Knife exactly right for your application.

And, if you use SLITTER KNIVES, there's a Simonds "Red Streak" Slitter Knife just right for the exact kind of metal you're slitting.

Both of these quality Simonds products are engineered to give you maximum performance. For example, Simonds Shear Knives are heat treated in atmospherically controlled furnaces to insure exactly the right temper and hardness for the desired application. And, each knife is precision ground and drilled to exact machine specifications.

ALL of Simonds Slitter Knives are forged for

maximum strength and wear resistance. They are precision ground to close tolerances and feature a low micro-inch surface finish. Hardened and ground Spacing Collars are also furnished as "fitting" companions for the Knives.

Heat treated Separator Discs, made from Simonds Alloy-Steel, resist wear, stay flat, last for years.

Get full details on these top performers from your nearest Simonds Factory Branch—ask for Bulletins S-20 and S-65.



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Simonds Abrasive Co., Philadelphia, Pa., and Arvida, Que., Canada

## LETTERS FROM READERS

### Inside Report

Sir—I would appreciate twelve extra reprints of the special report on "Why Collective Bargaining Failed in the Steel Negotiations" by Editor-in-Chief Tom Campbell in your Oct. 29 issue.

Also, we would like to have twelve extra copies of the article on p. 95 of the same issue entitled "New Small Cars Aren't All Alike."—W. E. Ward, Mfg. Services, Stamping Div., Chrysler Corp., Detroit.

Sir—We would like twelve more copies of this article.—W. M. Porter, Assistant Secretary, Engineers' Society of Western Pennsylvania, Pittsburgh.

### Planning Growth

Sir—Recently I wrote to you and asked for a few copies of a very interesting article which appeared in the Oct. 15 issue—"How to Prepare for Future Company Growth."

I have received these and am distributing them to some of our executives because I think the article contains very instructive advice.

It has many very appropriate thoughts regarding the growth of a business such as ours—the machine tool industry.

Thanks for sending these to me.—C. R. Rosborough, President, Moline Tool Co., Moline, Ill.

■ In all cases, reprints have been sent.—Ed.

### Corrosion Report

Sir—In a recent Newsfront (Oct. 22 issue) there is an item about a report on corrosion of metals by

rubbers and plastics. It is published by the Office of Technical Services. Could you give me a more complete address for the office so that I can write for the report.—P. W. Nolan, Mgr. Marketing Planning, Metals Div., Kelsey-Hayes Co., New Hartford, N. Y.

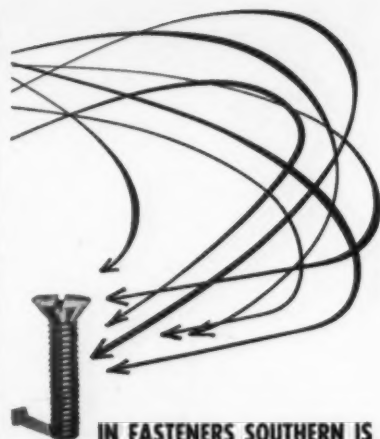
■ In placing your order for the complete report address it to the Office of Technical Services, U. S. Dept. of Commerce, Wash. 25, D. C. The form number of the report is PB 151750. There is a charge of \$1.25 for it.—Ed.

### Strike's Impact

Sir—The pleasure and satisfaction we had in reading your editorial in the Oct. 22 issue (Art of Communications: Much Harder Than You Think) as well as the article in your Oct. 15 issue also by Editor-in-Chief Tom Campbell (The Strike's Full Impact) was too great to permit us to allow the opportunity of expressing our appreciation go by without acting upon it. We feel this article is a most realistic and concise summation of the steel labor situation.—R. L. Deily, Messer Cutting Machine, Inc., New York.



"Pssst! Boss coming!—Look busy!"



# ATTRACTION

There are countless reasons why Southern screws have a logical attraction for industries. First, Southern attracts those who know from experience that quality fasteners help maintain top production speeds. They know, too, that expensive down-time and materials loss can be minimized by standardizing on dependable fasteners made by Southern Screw. Service is another attraction for customers who rely on Southern for fast handling of every order of every size. All along the line, Southern's unquestioned superiority makes for a more attractive profit picture—a "must" in every growing industry... Wire, phone or write your requirements now. Address: Southern Screw Company, P. O. Box 1360, Statesville, North Carolina.

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12 B&W IFB lined single stack annealing covers in use in the strip annealing department of Weirton Steel Company, a division of National Steel Corporation, at Weirton, West Virginia.

## uses lightweight B&W Insulating Firebrick for single stack annealing covers.

These 12 covers, lined with B&W K-20 Insulating Firebrick, have been in service more than two years in the annealing of low and high carbon strip from Weirton's 54" strip mill. Identical in construction, the covers are over 17 feet from base to skew and over 10 feet in diameter. The domes are of 9" K-20 IFB construction.

The K-20 is one of B&W's *lightweight* Insulating Firebrick. In fact, B&W K-20 IFB are at least a third of a

pound lighter than other 2000 F insulating firebrick. This means savings in the overall weight of portable covers. Additional savings in fuel consumption and cycle time are possible because lightweight B&W IFB store and conduct less heat. Heat is kept in the furnace, not in the lining.

This application points out advantages of light weight in insulating firebrick constructions. And B&W makes the *lightest* weight insulating

firebrick. Consult your B&W Refractories Representative for information on how you can profit with lightweight B&W IFB.

**Bulletin R-2-H available on request.**



### **B&W REFRACTORIES PRODUCTS:**

B&W Allmul Firebrick • B&W 80 Firebrick • B&W Junior Firebrick  
• B&W Insulating Firebrick • B&W Refractory Castables, Plastics and  
Mortars • B&W Silicon Carbide • B&W Ramming Mixes • B&W Kaowool

## FATIGUE CRACKS

### Why Nikita Smiles (II)

A "Disgruntled Reader" writes to criticize the poem we ran in this column last week. "Today," he says, "it is very unlikely to find anybody getting 'something for nothing.'"

Further, he feels that there is nothing "to discourage those with strength and drive."

**Two More Voices**—Funny that the poem should have appeared in the same issue as Tom Campbell's editorial saying that "we are definitely becoming a second class nation."

And by sheer coincidence we have a market letter from Walter K. Gutman, our favorite Wall Street analyst. "It is interesting," says W.K.G., "to see a great nation go down . . . everyone is trying to find the right answer—some are shouting 'the ship is sinking' but others say 'it's not sinking—the water is just a little nearer, that's all.'"

Our private opinion is that whether the ship is sinking—or the water getting closer—the need to man the pumps is the same. And everyone is going to have to push instead of riding the handle.

### Among Our Souvenirs

Among the large bundles of newspaper clips showing the number of times IRON AGE has been quoted during the steel strike, we found this gem.

"Relics officially described as dating back to the second Iron Age, 800 years B.C., have been unearthed near Amman, Jordan."

Obviously, this story was not dealing with the 1959 steel strike. And while we're proud of our long coverage of metalworking, now in its 104th year, we don't go back into the B.C. era.

### Puzzler Answer

So far the highest number of combinations of 21 coins totaling \$1.00 (Oct. 22 puzzler) is five.

So far, F. W. Haecker, Process Engineer, Yale & Towne, White Plains, N. Y., and James L. Funk and Don J. Goodwin, Frazier-Simplex, Washington, Penn., reached the five mark.

Doris A. Lee, Engineering Division, Ritter Co., Rochester, N. Y., W. R. Mess, Chicago, and Norbert J. Daugherty, Westinghouse Electric Corp., Pittsburgh, hit for four.

### New Puzzler

There are two horses exactly six miles apart who start walking towards each other at the rate of  $1\frac{1}{2}$  miles per hour. At the same time a bee starts flying from the nose of one horse. Upon touching it, and without losing even the fraction of a second, he starts back until he touches the other horse's nose and returns again. The bee flies at the rate of 10 miles per hour. How far does the bee fly until the two horses' noses touch?



"This one's coffee!"



Photomicrograph of a cross section of a typical North PVC glove. Notice the extra-thick coating. That's where the wear is!

## LESS LINER! MORE GLOVE!

That's why North PVC gloves by Jomac give longer service... better protection!

When you compare gloves, remember this: we use a special lightweight knitted liner and *extra coating*. Some manufacturers use heavy cotton flannel liners and *less coating*. Although total weights may be the same, you get a better value with North PVC gloves, because you're paying for gloves . . . not liners! The wear, after all, is in the coating.

And that isn't all! We offer a better selection of sizes . . . and that means greater comfort, greater dexterity, greater productivity for every worker on every job.

**FREE OFFER!** On your business letterhead, send us complete details of your working conditions, and we will send you a sample pair. Do it today!

## JOMAC INDUSTRIAL GLOVES

Jomac Incorporated, Dept. K, Phila. 38, Pa.  
Plants in Philadelphia, Pa., and Warsaw, Ind.  
In Canada: Safety Supply Company, Toronto  
In Europe: North-Jomac Ltd., London, W1

# General Electric announces the new Adjust-O-Breaker toolholder!

Carboloy® toolholder with adjustable chipbreaker lets you adjust from any angle . . . offers any desired adjustment within its range\* . . . features "floating" indexable chipbreaker with absolute repeatability.

*MORE* jobs with *LESS* tooling—that's what you get with this new Carboloy® Adjust-O-Breaker toolholder! No need to have a separate chipbreaker for every cutting job. No need to restrict yourself to toolholders with only two or three chipbreaker settings. Now you can have this versatile new Carboloy toolholder . . . and *adjust it for any chipbreaker setting within its range.\**

Available right now from stock in 5 styles, negative rake, for left- and right-hand machining, the Adjust-O-Breaker truly brings new meaning to disposable tooling.

So, to get cutting tool versatility that lets you handle *more* jobs with *less* tooling, check into the complete Carboloy line—*Lift-O-Matic* (positive rake, negative rake, and tracer), heavy-duty, and the new Adjust-O-Breaker toolholder. The complete line of Carboloy inserts, insert seats, convertible seats, and brazed tooling is the *broadest* in the industry . . . designed to meet *every* tooling need to give you **BETTER PROFITS THROUGH BETTER TOOLING.**

See your Authorized Carboloy Distributor now. He's listed in the Yellow Pages. *Metallurgical Products Department of General Electric Company, 11153 E. 8 Mile Road, Detroit 32, Michigan.*

**CARBOLLOY®**  
CEMENTED CARBIDES

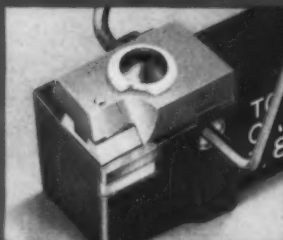
METALLURGICAL PRODUCTS DEPARTMENT  
**GENERAL  ELECTRIC**

CARBOLLOY® CEMENTED CARBIDES  
MAN-MADE DIAMONDS • MAGNETIC MATERIALS  
THERMISTORS • THYRISTERS • VACUUM-MELTED ALLOYS

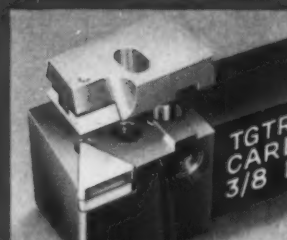
## Metallurgical Memo from General Electric



\*Size 15V and 25V, adjustable range 1/8" to 3/8"  
Size 30V, adjustable range 1/8" to 1/2"



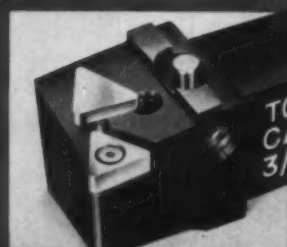
1. Chipbreaker setting adjusts to any width within range.\* Set screw with two open ends provides access from either side. No springs to adjust.



2. Design permits absolute repeatability of settings. Floating chipbreaker is indexable. Can't drop out when clamp is loosened.



3. Clamp extends rearward from top or bottom, allows easy indexing or replacement even when toolholder is vertical or upside down.



4. Standard disposable inserts, Carboloy insert seats and convertible seats are used with toolholder. Insert seats are indexable and self-aligning.

## COMING EXHIBITS

**Plant Maintenance & Engineering Show** — Jan. 25-28, Convention Hall, Philadelphia. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

**Tool Show**—April 21-28, Detroit Artillery Armory, Detroit. (American Society of Tool Engineers, 10700 Puritan, Detroit 38.)

**Design Engineering Show**—May 23-26, Coliseum, New York. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

**Production Engineering Show** — Sept. 6-16, Navy Pier, Chicago. (Clapp & Poliak, Inc., 341 Madison Ave., New York 17.)

## MEETINGS

### NOVEMBER

**National Electrical Manufacturers Assn.**—Annual meeting, Nov. 9-13, Traymore Hotel, Atlantic City, N. J. Association headquarters, 155 E. 44th St., New York 17.

**National Assn. of Waste Material Dealers, Inc.**—National fall meeting, Nov. 11-15, Diplomat Hotel, Hollywood Beach, Fla. Association headquarters, 271 Madison Ave., New York 16.

**National Screw Machine Products Assn.** — Annual fall membership meeting, Nov. 15-19, Americana Hotel, Bal Harbour, Fla. Association headquarters, 2860 E. 130th St. Cleveland.

**Packaging Institute**—Annual meeting, Nov. 16-18, Statler-Hilton, New York. Institute headquarters, 342 Madison Ave., New York 17, N. Y.

**Aircraft Industries Assn. of America**—Annual meeting, Nov. 18-20, Arizona Biltmore Hotel, Phoenix, Ariz. Association headquarters, 610 Shoreham Bldg., Washington 5, D. C.

(Continued on P. 16)

# "FASTER FROM FOSTER" service delivers any kind of pipe ...ANYWHERE

One call to any of Foster's six nationwide warehouses gets you immediate delivery of all the pipe you need, regardless of type, size or specification. L. B. Foster Company has made a specialty of supplying the "hard-to-get" sizes, the unusual walls, the extra large quantities.

Take advantage of "single-source" buying for all of your pipe requirements: Tested and Structural Steel Pipe in all sizes and specifications ½" thru 48", Stainless, Seamless Alloy and Pressure Pipe—Aluminum, Wrought Iron and PVC Pipe—complete lines of Valves, Fittings and Flanges.

For "complete package" shipments—for savings in time and money—try "Faster-From-Foster" service. Write, wire or phone your nearest Foster office.

## L. B. FOSTER CO.

Pittsburgh 30, Pa. • New York 7, N.Y. • Chicago 4, Ill.  
Houston 2, Texas • Los Angeles 5, Calif. • Atlanta 8, Ga.



Send for current  
Pipe Stock List  
No. 1A-11

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# *If you are interested in a* **NEW PLANT LOCATION...**



write for

## **FREE LITERATURE**

### **WEST PENN POWER**

an operating unit of the WEST PENN ELECTRIC SYSTEM



Area Development Department, West Penn Power Company  
Cabin Hill, Greensburg, Pennsylvania

1A-14

Yes, we are considering a new plant location.

Please send:

- ☐ Plant Location Services booklet
- ☐ Plant & Site folder
- ☐ FACTS about WESTERN PENNSYLVANIA

Company \_\_\_\_\_ Phone \_\_\_\_\_

Individual \_\_\_\_\_ Title \_\_\_\_\_

Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_

## **MEETINGS**

(Continued from P. 15)

**National Machine Tool Builders' Assn.**—Annual meeting, Nov. 19-21, The Greenbrier, White Sulphur Springs, Va. Association headquarters, 2139 Wisconsin Ave., Washington, D. C.

**The American Society of Mechanical Engineers** — Annual meeting, Nov. 29-Dec. 4, Chalfonte Haddon Hall, Atlantic City, N. J. Society headquarters, 29 W. 39th St., New York.

**American Institute of Steel Construction, Inc.** — Annual convention, Nov. 30-Dec. 3, The Boca Raton Hotel & Club, Boca Raton, Fla. Institute headquarters, 101 Park Ave., New York.

### **DECEMBER**

**Electric Overhead Crane Institute**—Annual meeting, Dec. 2, Carlton House, Pittsburgh. Institute headquarters, One Thomas Circle, Washington 5, D. C.

**Electric Furnace Steel Committee**—17th Annual conference, Dec. 2-4, Hotel Cleveland, Cleveland. Committee headquarters, 29 W. 39th St., New York.

**Electronic Industries Assn.**—Quarterly meeting, Dec. 2-4, Statler Hilton, Los Angeles, Calif. Association headquarters, 1721 DeSales St., N. W., Washington, D. C.

**National Assn. of Manufacturers**—Annual meeting, Dec. 2-4, Waldorf-Astoria, New York. Association headquarters, 2 East 48th St., New York.

**National Warm Air Heating & Air Conditioning Assn.**—Meeting, Dec. 2-4, Chase Park Plaza Hotels, St. Louis, Mo. Association headquarters, 640 Engineers Bldg., Cleveland.

**Material Handling Institute, Inc.**—Annual meeting, Dec. 13-16, Savoy-Hilton Hotel, New York. Information: Hanson & Shea Inc., One Gateway Center, Pittsburgh 22, Pa.



## *Put this truck to work . . . without buying it!*

For many companies, even the savings resulting from the use of the *right* equipment is overshadowed by the capital investment necessary. The logical answer, in such a case, is to lease.

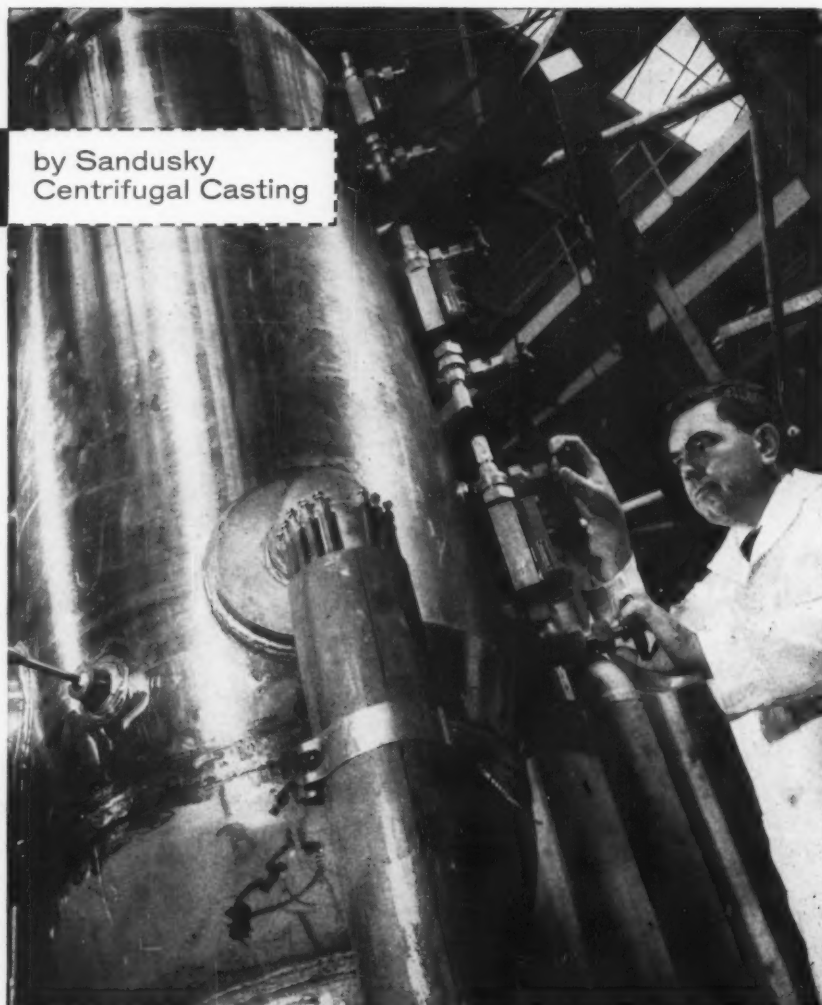
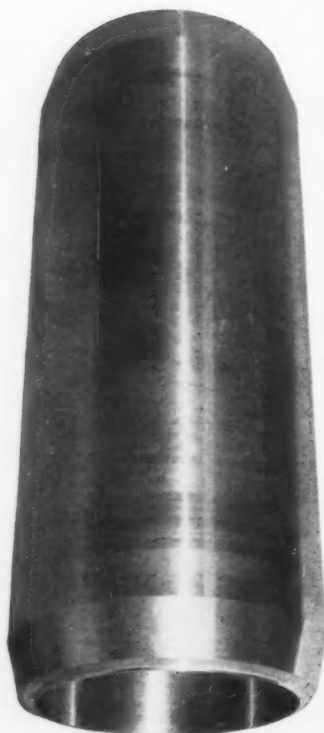
Without tying up a cent of working capital, the Clark Lease Plan permits you to select materials handling equipment from the world's *most* complete line. No down-payment or outside financing is necessary, and you have the added advantage of dealing directly with your local Clark dealer.

The savings the equipment brings are usually greater than the leasing rate. In fact, most users of the Lease Plan find the cost-cutting factors of using modern handling equipment *far outweigh* the modest monthly rates. For a detailed brochure giving full particulars of the Clark Lease Plan, simply write: Leasing, Clark Equipment Co., Battle Creek, Michigan.

**CLARK**  
EQUIPMENT

**SOLVED:**

by Sandusky  
Centrifugal Casting



This photo, showing the Sandusky cylinder welded into position, courtesy of the Lummus Company, New York. New York who fabricated, assembled and tested the completed loop before shipping it to the ETR site in Idaho.

## Nuclear Test Loop Uses Sandusky Centrifugal Casting as Pressurizer Cylinder

A Sandusky Centrifugal Casting is the main cylindrical component of an electrically heated pressurizer, designed by Knolls Atomic Power Laboratory to Section VIII, of the ASME Code (Unfired Pressure Vessels) for use in the new Engineering Test Reactor facilities at Idaho Falls, Idaho.

This 66 $\frac{1}{2}$ " long cylinder, 27" O.D. with walls 2 $\frac{1}{2}$ " thick, was centrifugally cast of an 18-8 stainless steel (SA-351, Grade CF-8) for the extra corrosion resistance required under nuclear loop service conditions: demineralized water at temperatures to 650°F and pressures to 2500 PSI.

O. G. Kelley Co., Boston, to whom we delivered

this 2-ton, fully machined cylinder, welded on the forged heads and nozzles, radiographed the welds, and hydro tested the completed vessel to 4300 PSI.

This is another example of the adaptability of Sandusky Centrifugal Castings to applications demanding the highest order of quality. They may well offer you a practical and economical answer to your cylindrical needs, also.

We are producing cylinders and piping in diameters from 7" to 54"—in lengths to 33 ft.—in a wide range of ferrous and non-ferrous alloys. Write for Bulletin 300, for more complete technical information on the Sandusky process and product application data.

**SANDUSKY**



**CENTRIFUGAL CASTINGS**

**FOUNDRY & MACHINE CO.**

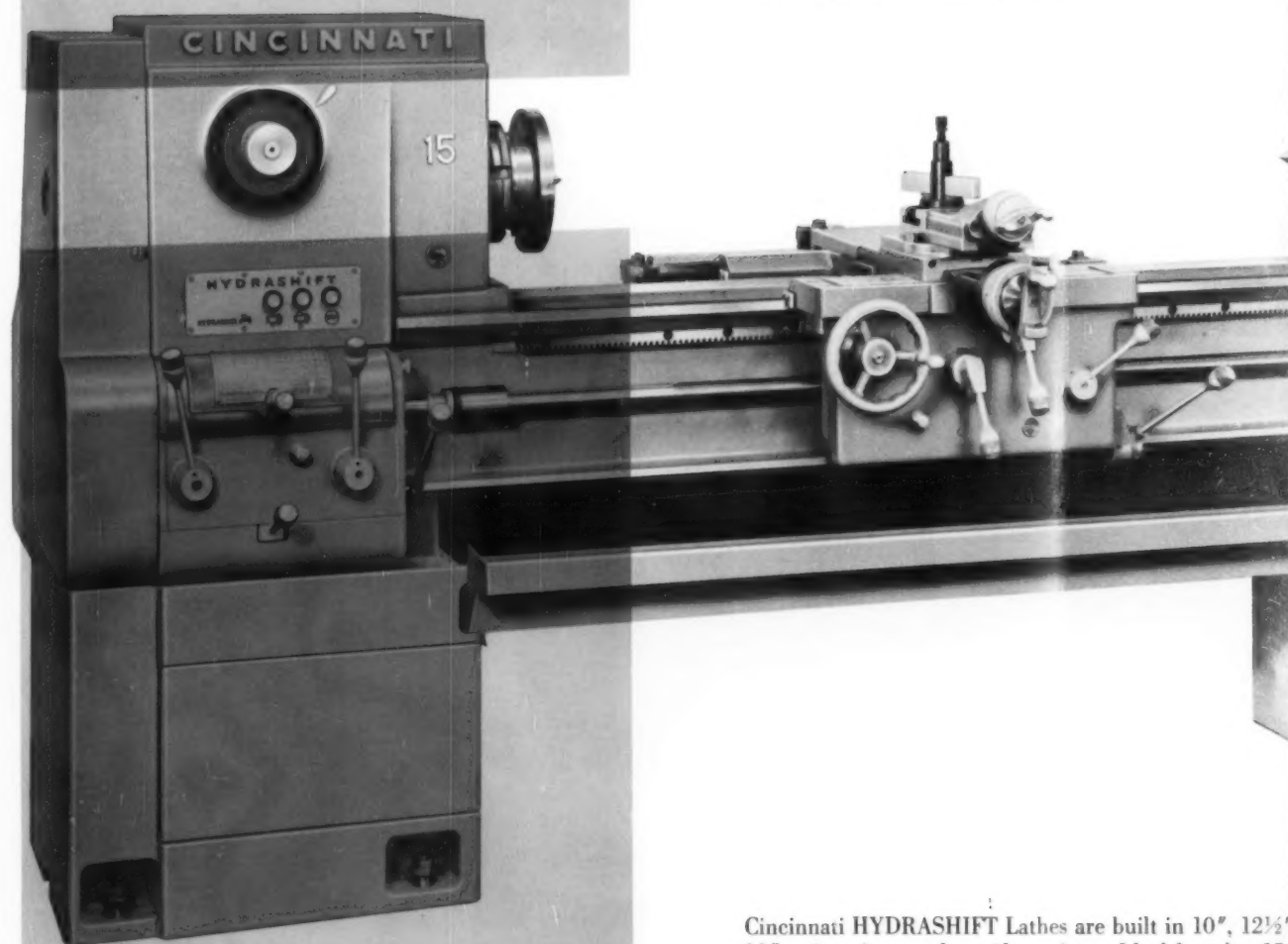
SANDUSKY, OHIO—Stainless, Carbon, Low-Alloy Steels—Full Range Copper-Base, Nickel-Base Alloys

hydraulic power supplies the n

~~new~~  
~~new~~

cincinnati hydrashift

hydrashift, the easiest and fastest method for geared head lathe, cuts machine handling time . . . let work. To change spindle speeds, the operator has only hydraulic power does the shifting.



Cincinnati HYDRASHIFT Lathes are built in 10", 12½", 18" swing sizes, and a wide variety of bed lengths. 15" sizes may be equipped with Cincinnati HYDRAGUID for even greater productivity.

Ask your CL&T Dealer today about this exciting new development from CINCINNATI, or write to us direct.



cincinnati lathe and tool co. 3207 di

"HYDRASHIFT" Lathes / "CINCINNATI" D

# the muscle on

## hydrashift

and fastest method for spindle speed shifting on a handling time . . . lets the operator produce more the operator has only to dial the desired RPM . . .



are built in 10", 12½", 15" and  
ety of bed lengths. 15" and 18"  
cincinnati HYDRAGUIDE tracers

about this exciting new development  
direct.

These CINCINNATI LATHES are NEW—from headstock to tailstock! They are designed to provide more time for cutting and to reduce operator fatigue to a minimum. Yet, with their many new operating features, they are still economy priced.

**new** High Speeds with All-Geared Headstock—husky, Hydrashift gearing provides 12 speeds in geometric progression up to 3000 RPM.

**new** Compound and Cross Slide—wider, heavier bridge, compound and cross slide for heavy, high-speed cuts; large, easy-reading dials for new accuracies with greater operator speed and convenience.

**new** Quick-Clamping Tailstock—Cincinnati's unique tailstock design is even more versatile for fast tailstock positioning.

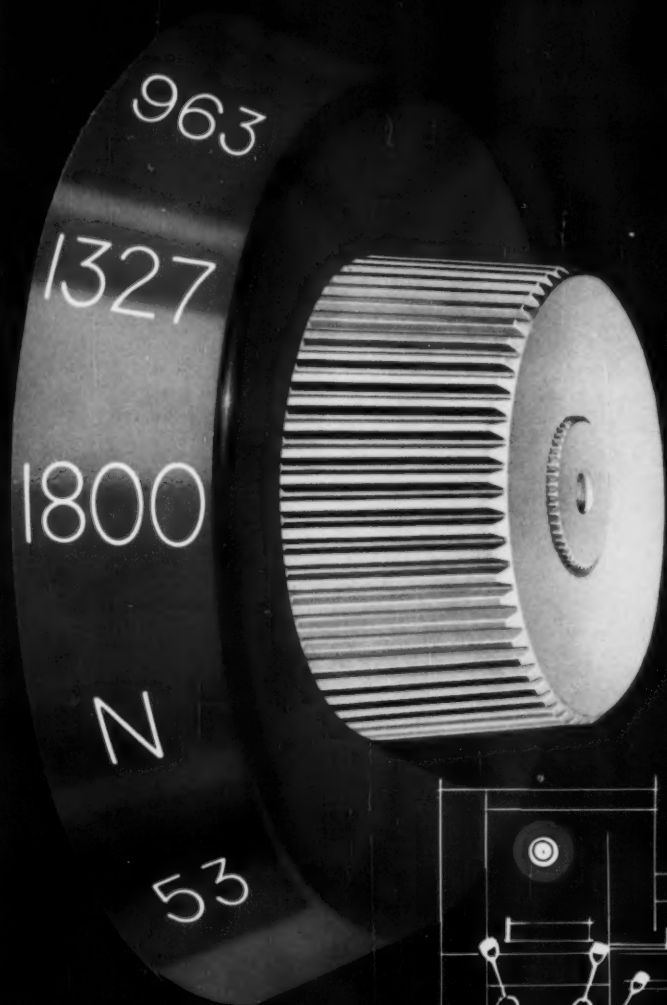
**plus new** greater horsepower . . . NEW husky beds with "Hardclad" flame-hardened ways . . . NEW coded push-button controls . . . NEW chip pan (slides in and out for convenient cleaning) . . . Totally enclosed quick-change feed box with 48 threads and feeds . . . and many other exclusive features on the NEW CINCINNATI HYDRASHIFT LATHES.

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"CINCINNATI" Drilling Machines / "SPIROPOINT" Drill Sharpeners

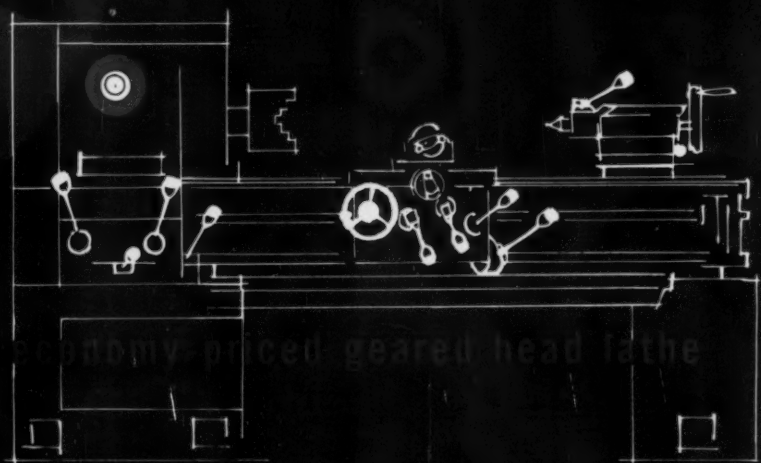






~~new~~  
**new**

from Cincinnati  
lathe and tool....



the first economy-priced geared head lathe

with power dial  
speed shifting

Cincinnati Hydrashift

**"...saving about \$80 a week!"**

CIMPLUS, transparent, rust-preventing cutting fluid of the famous CIMCOOL family, scores sensationally at another busy shop.\*

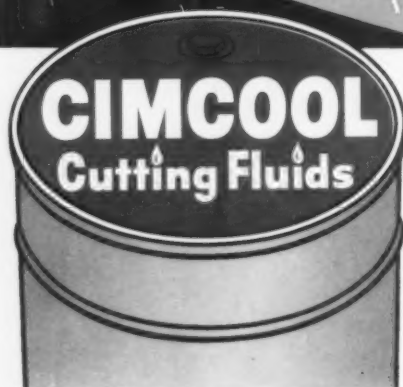
2 SALES REPORT

plant makes woodworking machinery. Their 7 grinding machines, running 8 hours a day, were using a soluble oil coolant at the rate of 24 gallons a week. They changed to Cimplus and now they get by fine on only 10 gallons of Cimplus a week. They're saving about \$80 a week!

They report they have no rancidity and no rust problems now. They like the transparency of Cimplus, too. The operators can see what they're doing.

*Bill Matzke*  
Chicago Office

\*Firm name available on request.



FOR 100% OF ALL METAL CUTTING JOBS  
Production-proved products of The Cincinnati Milling Machine Co.

CIMCOOL S2 Concentrate—The pink fluid which covers 85% of all metal cutting jobs.  
CIMPERIAL—newest in the famous, industry-proven line of CIMCOOL® Cutting Fluids!  
CIMPLUS—The transparent grinding fluid which provides exceptional rust control.  
CIMCUT Concentrates (AA, NC, SS)—For every job requiring an oil-base cutting fluid.  
ALSO—CIMCOOL Tapping Compound—CIMCOOL Bactericide—CIMCOOL Machine Cleaner.

For full information on the complete family of CIMCOOL Cutting Fluids, call your CIMCOOL Distributor. Or contact Cincinnati Milling Products Division, Cincinnati 9, Ohio.

\*Trade Mark Reg. U.S. Pat. Off.



**Ask**

**HEVI-DUTY**

*...The Brush  
Beryllium Company  
did...*

**and assured  
'round-the-clock  
production  
of pure beryllium  
billets with  
HEVI-DUTY  
pit-type  
vacuum furnaces**



*Operating continuously, two Hevi-Duty pit-type vacuum furnaces produce high-purity beryllium billets. The framework over the furnaces supports the presses. Forged heat shields for the test models of Project Mercury's space capsule are being manufactured by Brush Beryllium from billets produced in these furnaces.*

Two tons of high-purity beryllium billets are produced every week in two Hevi-Duty vacuum furnaces at The Brush Beryllium Company, Elmore, Ohio. These specially engineered, double pump vacuum furnaces operate continuously—24 hours a day; 7 days a week. They produce billets up to 40" diameter by 40" high. Brush Beryllium selected Hevi-Duty furnaces for continuous and simultaneous application of heat, vacuum and pressure. Beryllium powder is sintered at 1050° C. and subjected to 400 psi pressure inside the furnace retort. Three zones of control provide fast heating response,

and assure the desired, uniform temperature. A 2000 micron vacuum is maintained at the high temperature, and during the cooling cycle.

Hevi-Duty offers standard bell or pit-type vacuum furnaces for operation to 2000° F. (2100° F. for intermittent service).

Hevi-Duty engineers can help you find the effective solution to most of your heat application problems. Whether it is a standard or special job, Hevi-Duty designs and builds the electric or fuel-fired furnace for most processing requirements.

**HEVI-DUTY**



A DIVISION OF

**BASIC PRODUCTS CORPORATION**

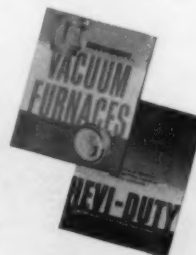
**HEVI-DUTY ELECTRIC COMPANY, MILWAUKEE 1, WISCONSIN**

Industrial Furnaces and Ovens, Electric and Fuel • Laboratory Furnaces • Dry Type Transformers • Constant Current Regulators



**ASK HEVI-DUTY**

for more information about  
vacuum furnaces with operating  
temperatures to 2100° F.  
Write for Bulletins 557 and 653A.



# How Ralph Hockett increased diamond wheel life 72%

If ever a man was a perfectionist, that man is Glenn Carr, General Foreman of the Tool Grinding Department at the Wichita Division of the Boeing Airplane Company. And, after fifteen years of working to the kind of tolerances required by the world's leading builder of super-bombers, he tends to be skeptical of miraculous claims.

That's why Ralph Hockett of Bay State distributor Wichita Pump & Supply Co., didn't make much fuss about Bay State's new diamond wheels. He analyzed the problem in his usual fact-finding manner, submitted wheels for test and let them speak for themselves.

The result was an eye-opener. The pay-off was in wheel life. Against an average life of 125 hours previously, the new Bay State wheels averaged 215 hours per wheel!

One important factor contributing to this bonus wheel life was the use of Bay State's unique BA Resinoid bond.

The Bay State wheels were not only longer-lasting but they were more versatile, cooler cutting and gave a far superior finish. They are now, of course, a regular inventory item at Boeing, Wichita, where B-52 missile bombers are in production for the Air Force.

If you have a diamond-wheel grinding problem, you'll find that your Bay State representative, direct or distributor, is ready to supply the right wheel for the job with either natural or man-made diamond abrasive... and he may well be able to give you a significant improvement in performance, too. Better grinding at lower cost... that is his business.

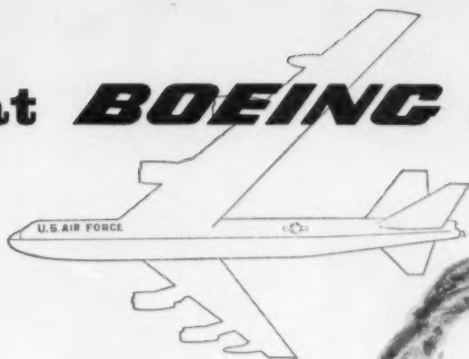


This new catalog, which includes pricing data, gladly sent on your request. Ask for Form 217.



Operator Harvey Johnson checks the finish on carbide-inserted tooth of a milling cutter after grinding with Bay State's 215-hour (average life) diamond cup wheel. Glenn Carr, General Foreman, checks Johnson's reading against blueprint.

at **BOEING** WICHITA



You don't get to know the aircraft business overnight and Ralph Hockett is the first to admit that he has never stopped learning. 27 years as an abrasive specialist, with 19 of them servicing Boeing on everything from the early B-17s on up, have given him what you might call a substantial background in the industry.

# **BAY STATE ABRASIVES**



Bay State Abrasive Products Co., Westboro, Massachusetts.

In Canada: Bay State Abrasive Products Co., (Canada) Ltd., Brantford, Ontario.

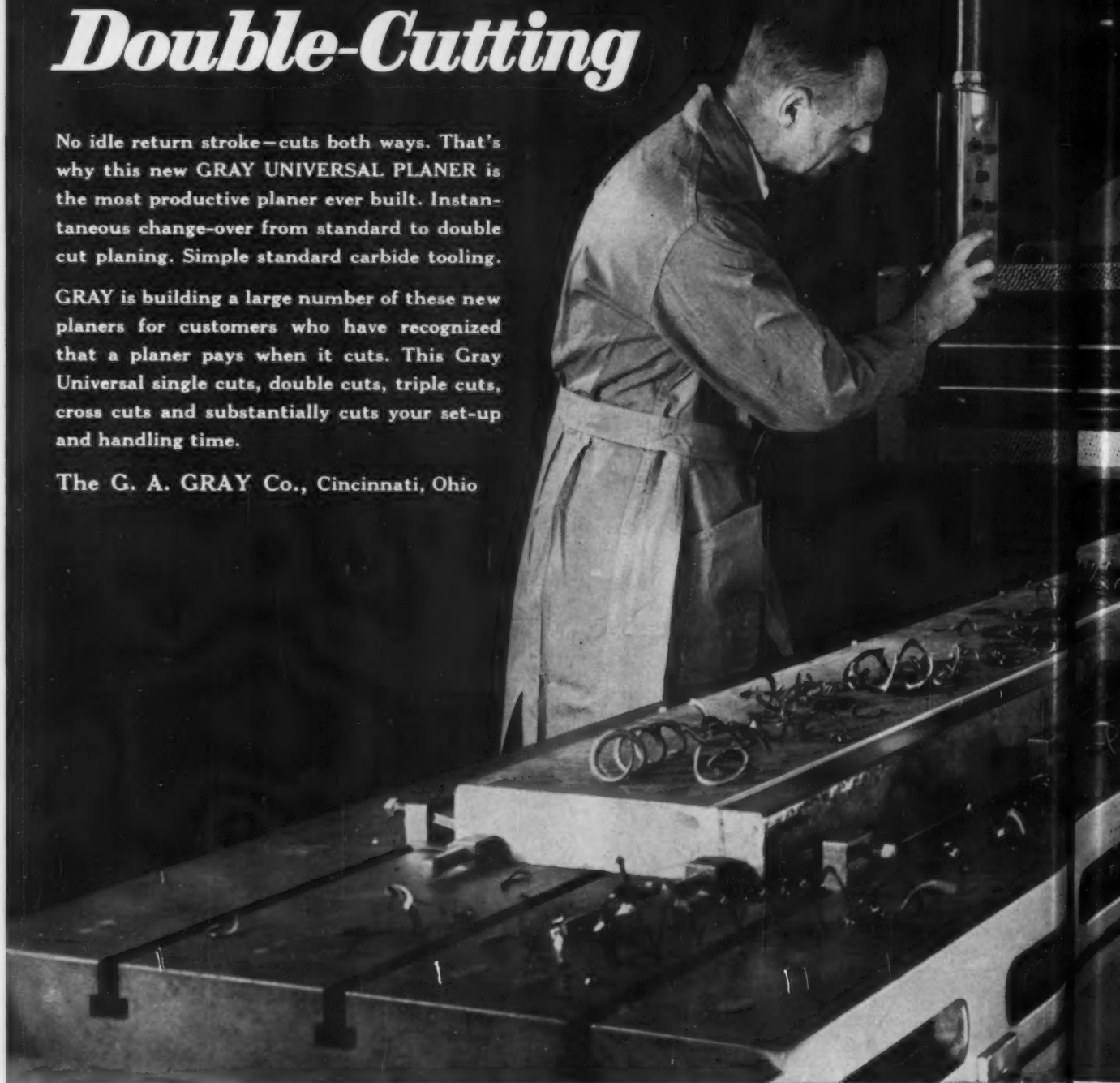
Branch Offices: Chicago, Cleveland, Detroit, Pittsburgh, Los Angeles. Distributors: All principal cities.

**cuts going  
cuts coming...that's**  
***Double-Cutting***

No idle return stroke—cuts both ways. That's why this new GRAY UNIVERSAL PLANER is the most productive planer ever built. Instantaneous change-over from standard to double cut planing. Simple standard carbide tooling.

GRAY is building a large number of these new planers for customers who have recognized that a planer pays when it cuts. This Gray Universal single cuts, double cuts, triple cuts, cross cuts and substantially cuts your set-up and handling time.

The G. A. GRAY Co., Cincinnati, Ohio



**heavy-duty planing**

The Gray Universal is the world's most powerful planer available for conventional planing. Its rigidity and speed are ideally suited for modern carbide cutting.



**double cut planing**

The flick of a lever, the touch of a button permits double cutting. Elimination of the idle stroke insures the world's most efficient flat surface machining. Only simple carbide tools are required.



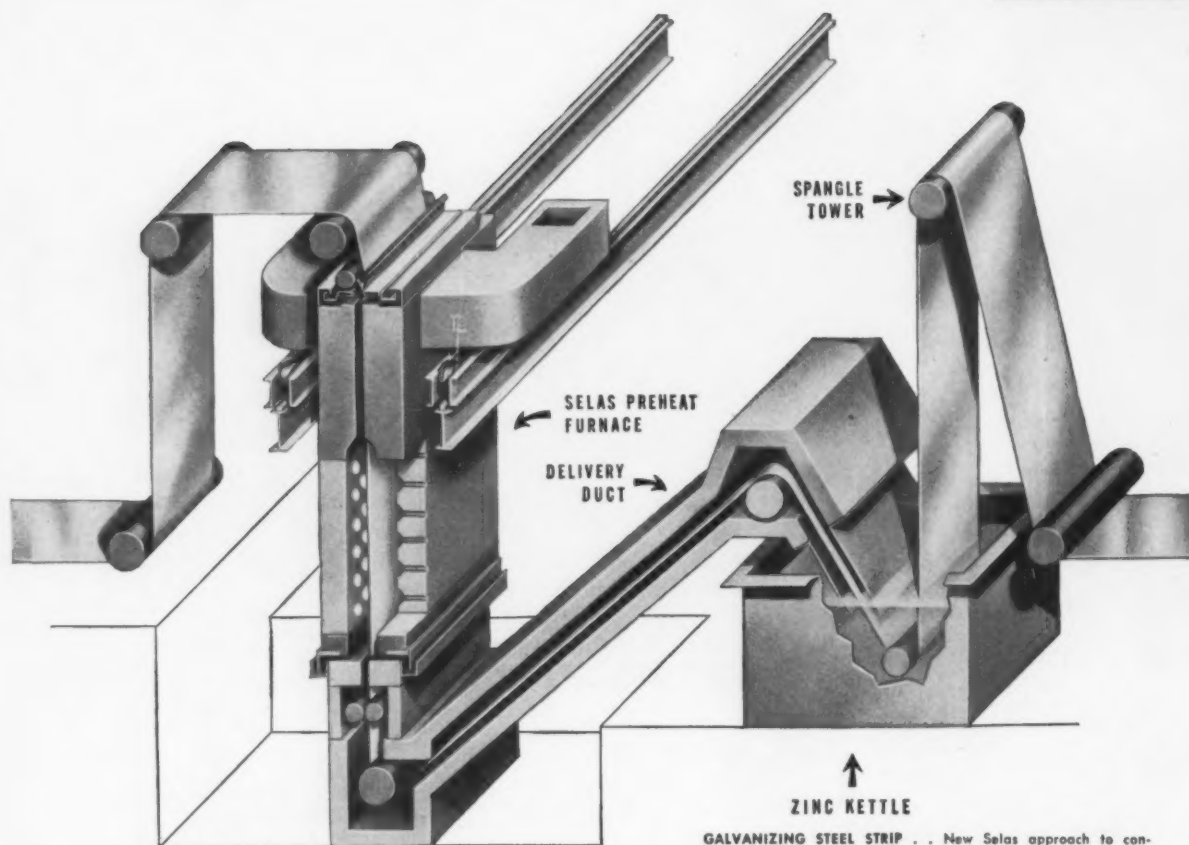
### **triple cut planing**

Rough and rough-finish plane at the same time. Rough by double cut planing and simultaneously rough-finish with a single point tool. Then finish plane without a tool change.



### **cross planing**

Eliminates extra settings by cross planing the occasional keyways, chamfered corners, and other troublesome small cross surfaces that formerly added hours to your set-up time.



## SELAS GRADIATION: Precise

## Heat Processing for the Steel Industry

Throughout the steel industry—in mills and metal-working plants—Selas Gradiation heat processing is successfully used in many operations. The versatility and adaptability of the Gradiation principle are demonstrated by the diversity of applications shown in the installation photographs on facing page.

Gradiation is a concept and technique of heat processing which coordinates fast, controlled heating with the nature of the workpiece . . . considering its composition, size, shape, heat transfer characteristics and physical properties . . . to develop desired product quality, in minimum time, with maximum efficiency,

and with the use of automatic and compact equipment.

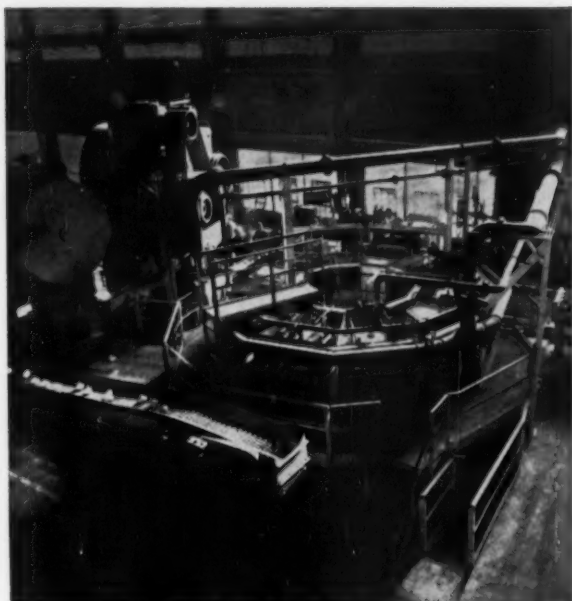
Designed and custom-built to meet your specific heat processing needs . . . for hot working . . . galvanizing . . . tinning . . . heat treating heavy sections and special shapes . . . Gradiation equipment contributes production economy, high production rates, ease of handling.

At your convenience . . . without cost or obligation to you . . . a Selas field engineer would welcome the opportunity to survey your needs. For this personal service—or for a copy of our new Bulletin 111 "Selas Gradiation Heating in the Steel Mill"—Write to Mr. J. F. Black, Manager of Sales, Steel Mill Div., Selas Corporation of America, Dresher, Pa.

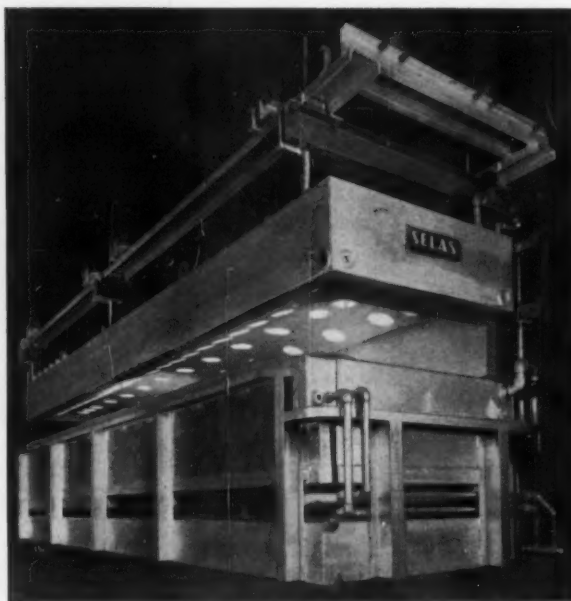
*Gradiation and Duradant are registered trade names of Selas Corporation of America.*

**SUBSIDIARIES:** Selas Constructors, Inc., Houston, Texas; Selas Corporation of America, European Div., S. A., Pregny, Geneva, Switzerland.  
**INTERNATIONAL REPRESENTATIVES AND LICENSEES:** CAMBODIA, FORMOSA, KOREA, LAOS, VIETNAM—Cosa Export Co., Inc.; AUSTRIA GERMANY—Indugas, Essen; JAPAN—International Machine Co., Ltd., Tokyo; ITALY—Italiana Gasogeni E. Forni S.r.l., Milano.

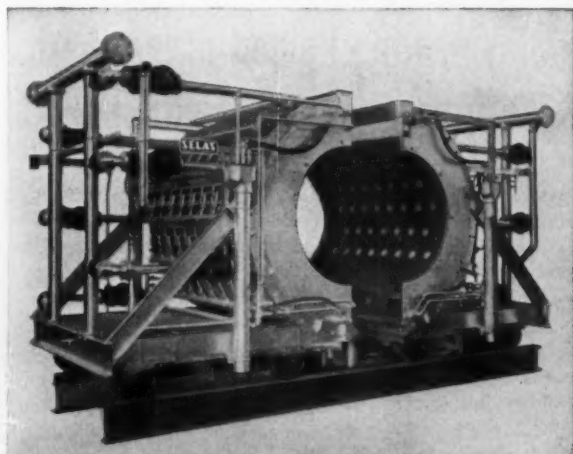
**is your reward**



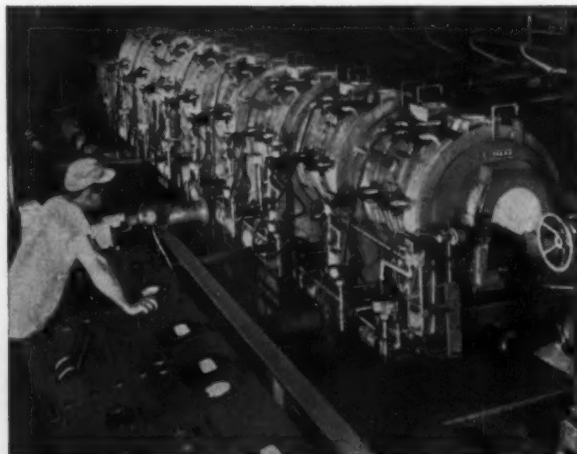
**STEEL BILLETS**,  $3\frac{1}{4}$  to  $4\frac{1}{4}$  in. square cross-section, 3.4 to 10.8 in. long, are heated for hot working in this Gradation rotary hearth. Compact furnace occupies 60% less floor space than required by conventional heat-and-soak equipment to achieve production rate of 11,000 lb per hr. Scale loss is 85% less. Entire heating cycle—as well as charge, discharge, transfer and press loading—is automated and synchronized with press operations.



**TUBE-ENDS** are heated for upsetting (for subsequent threading) in specially-designed Selsas slot-type furnaces. As each tube-end is fast heated to upsetting temperature, the tubing automatically moves down the handling table to the upsetting machine. The direct-fired Duradant® gas burners are patterned to assure temperature uniformity within a controlled section of each tube-end.



**ROLL HARDENING** is accomplished up to 12 times faster in this unique direct-fired Selsas split furnace. Patterned Gradation heating . . . coupled with the ability to rotate rolls during heating and quenching cycles . . . assures attainment of a controlled pattern of hardenability. Heat-up time is so rapid that harmful scale is eliminated. Even-heat distribution prevents formation of soft spots. Protection of roll shoulders leaves them unaffected by heat processing of roll barrel. Rolls up to 60 in. in diameter and a wide range of barrel lengths can be hardened.



**SEAMLESS TUBING** is heated for final sizing in this Selsas eight-barrel continuous furnace line. Three zones of automatic control assure that the heavy-walled tubing . . . up to 16 in. O.D. and 3 in. wall thickness . . . is brought precisely to predetermined temperature, throughout each length of tubing . . . consistently uniform from tube to tube.

**SELAS**  
CORPORATION OF AMERICA  
DRESHER PENNSYLVANIA

*Heat and Fluid Processing Engineers*  
DEVELOPMENT · DESIGN · CONSTRUCTION



## THE CASTINGS ANSWER CORNER



Send in your questions on stainless steel castings to Carl Tylka, Cooper Alloy Technical Service Director.

**Q.** What can be used for sulfuric acid resistance where FA-20 is not quite good enough?

**A.** Cooper 56 or 57 alloys may be used without going to the quite expensive alloy Hastelloy C.

**Q.** What is meant by "ferroxyl quality" in evaluation of a stainless casting?

**A.** This means a superior surface quality free from pinholes, porosity, scale particles, iron film, grease, or other undesirable conditions, as is guaranteed by passing the ferroxyl test.

**Q.** Will stainless steel of the 18-8 type corrode in a moist atmosphere?

**A.** Not ordinarily, but it will in contact with graphite.

**Q.** Will annealing 12% chromium alloy make it more resistant to corrosion?

**A.** No. Best corrosion resistance is obtained in the hardened or hardened and stress relieved condition.

**Q.** Is 18-8S MO (316) better than 18-8S (304) for use in hot strong nitric acid?

**A.** No, in this particular case 304 is better than 316.

**Q.** Is 304 satisfactory for handling 70% sulfuric acid at room temperature?

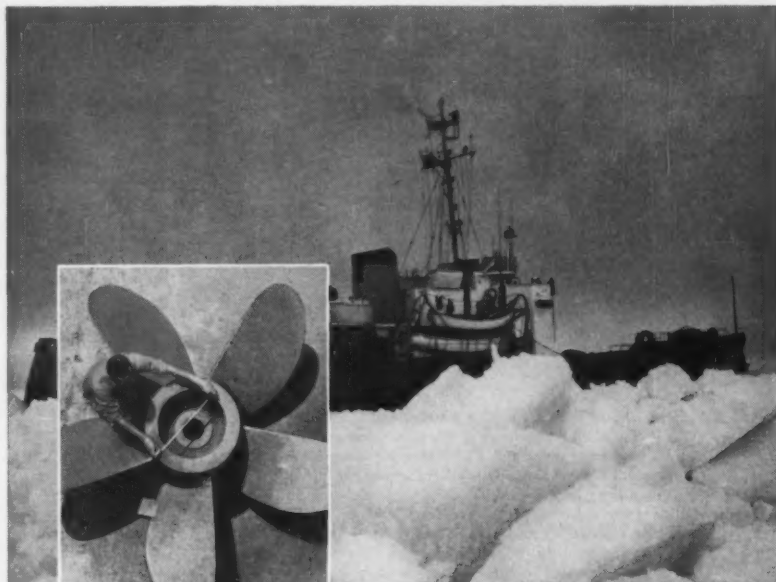
**A.** No. Believe it or not, carbon steel is satisfactory while 304 is not. If stainless is used, FA-20 must be resorted to.

**Q.** Why is it that steel is resistant to 70% sulfuric acid, while stainless 304 is not?

**A.** Because sulfuric acid forms an iron sulfate film on carbon steel which is insoluble in sulfuric acid of over 65% concentration, thus protecting the steel from further corrosion. This particular film does not form on stainless, which depends upon passivity for corrosion resistance. In 70% sulfuric acid passivity is lost and the stainless corrodes.

**Q.** Is 316 alloy better than 304 for handling hot caustic solutions?

**A.** No, 316 has no better resistance than 304 and FA-20. That is why monel is recommended. In extremely severe cases use pure nickel.



Coast Guard Photo

## This Cooper Alloy casting helped break the ice for the Coast Guard in a tight situation

The casting is the five-bladed, 8½' stainless steel propeller shown here. Cast by Cooper Alloy, it is used on Coast Guard icebreakers and buoy tenders like the one shown above in a historic tight situation. Even Washington crossing the Delaware was never subjected to a squeeze like this! This photo shows the Coast Guard buoy tender SPAR during her recent historic threading of the Northwest Passage.

This Passage is the tricky, winding, ice-ridden lane through Arctic waterways above Canada, from Labrador to Alaska. The 180-ft. SPAR and two sister ships made history when they recently completed the first deep-draft transit of the Passage, from west to east. During it, the ships were subjected to the worst ice and weather conditions of many years.

Breakdown under such conditions can mean real trouble. The situation,

in fact, is tight in two ways: icewise, for the ship and crew; corrosionwise, for the metal parts exposed to the corrosive-erosive action of the Arctic sea water.

That's why stainless steel was chosen as the metal for the propeller. Sea water is highly corrosive to most metals, particularly as here when high-velocity erosion conditions are also present.

The problems surrounding the casting of a propeller of this size are enormous; but Cooper Alloy has had years of experience in handling just such tricky stainless casting assignments.

Whether your casting is large or small, tricky or straightforward, Cooper Alloy has the know-how and the facilities to do the job, and do it right. If you have a stainless part in mind, contact Cooper Alloy Corporation, Hillside, N. J.

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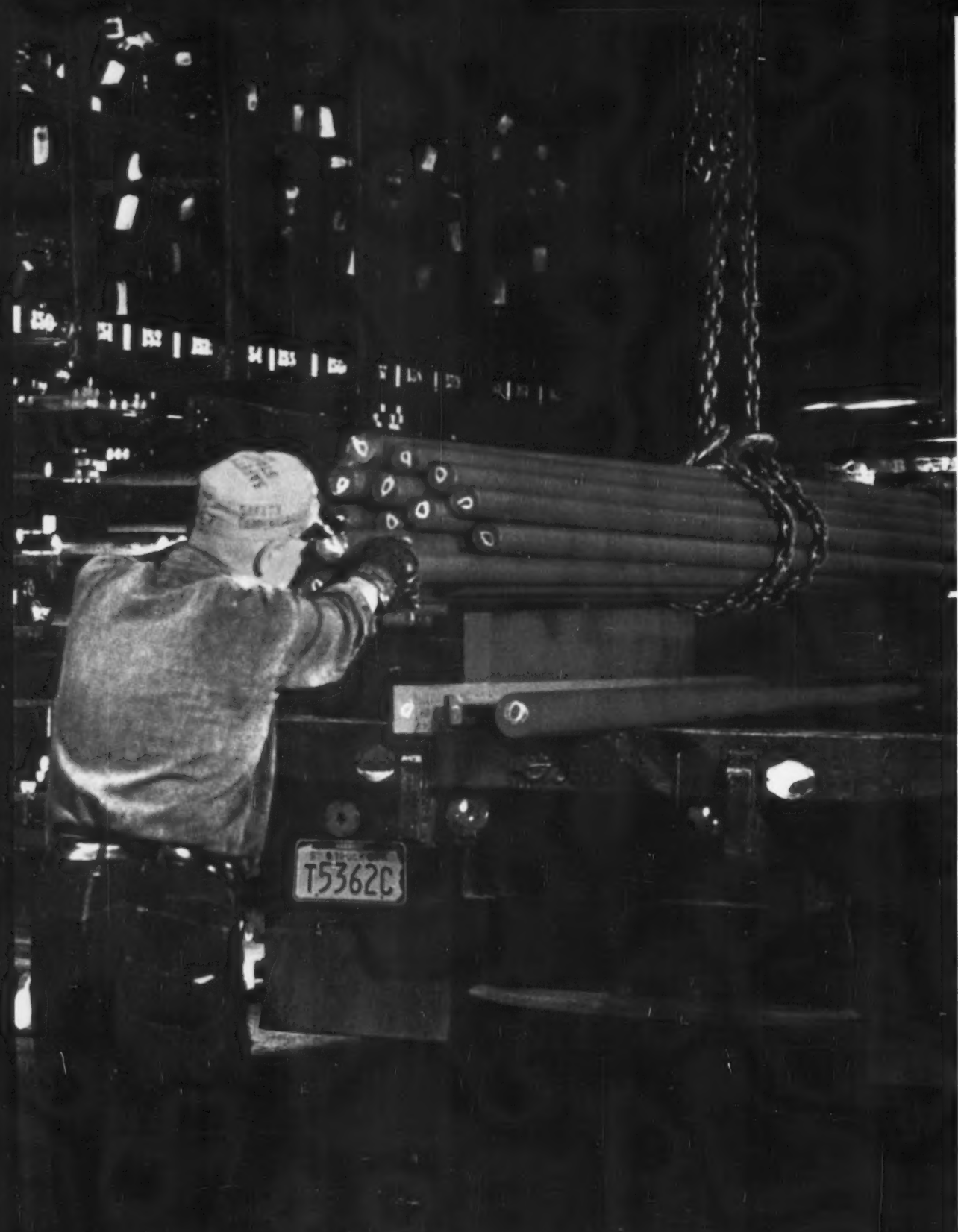
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*The entire surfaces of all Carpenter Matched Tool and Die Steel bars are color coded . . . each grade with its own distinctive color . . . assuring fast, positive identification. Another step towards predictable performance!*

**Predictable as the spectrum from a prism...**

# *Carpenter* MEL-TROL®

**...a new steelmaking process**

**...a new standard of uniformity**

**for tool and die steels in lot after lot**

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**Immediate delivery!** These grades of air-hardening Tool and Die Steels are ready for off-the-shelf delivery from your nearby *Carpenter SERVICE-CENTER*. Other available specialty steels of predictable performance are: *Carpenter* Stainless Steels—High Temperature Alloys—Electronic, Magnetic and Electrical Alloys—Special-Purpose Alloy Steels—Tubing and Pipe—Fine Wire Specialties.

**New concepts in service!** With the addition of new melting and finishing facilities, our capacity is nearly doubled. Better-than-ever quality... more research... more technical assistance... more local warehouses... *Carpenter* is growing bigger and better in all directions. Building upon a long history of pride in craftsmanship... backing up our faith in the future with dollars on the line... we are combining the best of modern technology and traditionalism. No wonder more and more men in industry, especially customers who know us best, refer to *Carpenter* as... *a new company 70 years old*.

## *Carpenter* steel



The Carpenter Steel Company, Main Office and Mills, Reading, Pa.  
Alloy Tube Division, Union, N. J.  
Webb Wire Division, New Brunswick, N. J.  
Carpenter Steel of New England, Inc., Bridgeport, Conn.

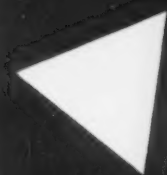
*don't you wish  
you could forecast  
with the same accuracy  
the performance of the*

# **tool and die steels**

*you use?*







*The performance of  
this prism is predictable  
... it repeats the same  
spectrum every time*

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**stainless steels! tool and die steels! special-purpose alloy steels!**



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**Mill-Branch Offices and Representatives**

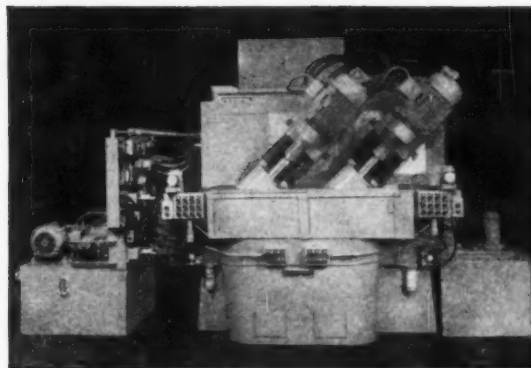
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Des Moines, Iowa	Jackson, Miss.	New Orleans, La.	Seattle, Wash.
El Cajon, Calif.	Kansas City, Mo.	New York, N. Y.	Shreveport, La.
Evansville, Ind.	Los Angeles, Calif.	Pittsburgh, Pa.	Syracuse, N. Y.
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Hialeah, Florida	Memphis, Tenn.	Portland, Ore.	

**The Carpenter Steel Company, Reading, Pa.**



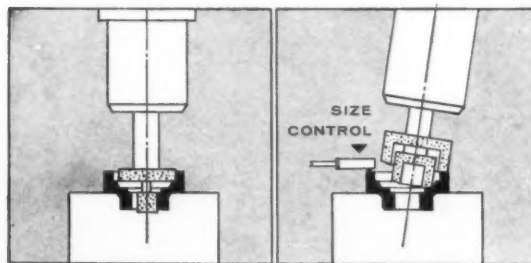
# Vertical grinding reduces setups

## SPRINGFIELD



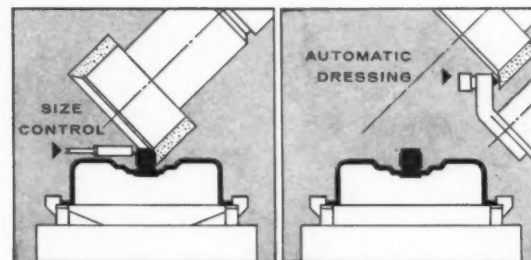
One head grinds while the other retracts for dressing, unloading and loading.

The double spindle Springfield vertical grinder in the photo is typical of vertical grinders automotive production men are using to 1) reduce setups, 2) improve grinding productivity, and 3) save floor space.



Transmission sun gear, 4 surfaces ground in 2 operations.

Two double spindle vertical grinders grind 330 gears per hour. Size control and wheel dressing are accomplished automatically. Typical machine cycle shown below.



Transmission housing hub, 1.—form grinding with automatic size control; 2.—spindle retracted for automatic dressing while operator unloads machine.

When part requirements change, only dresser, fixtures and sizing devices change—the machine itself has a long production life because heads can be repositioned easily.

Springfield special vertical grinders, with any desired degree of automation, pay for themselves in two years or less on long runs; standard Springfield vertical grinders pay off rapidly in large toolrooms and job shops.

We'd like to discuss with you the principle of vertical grinding, vertical contour grinding, and subsequent cost savings. Please send today for illustrated Bulletin 197-B. The Springfield Machine Tool Company, Springfield, O.

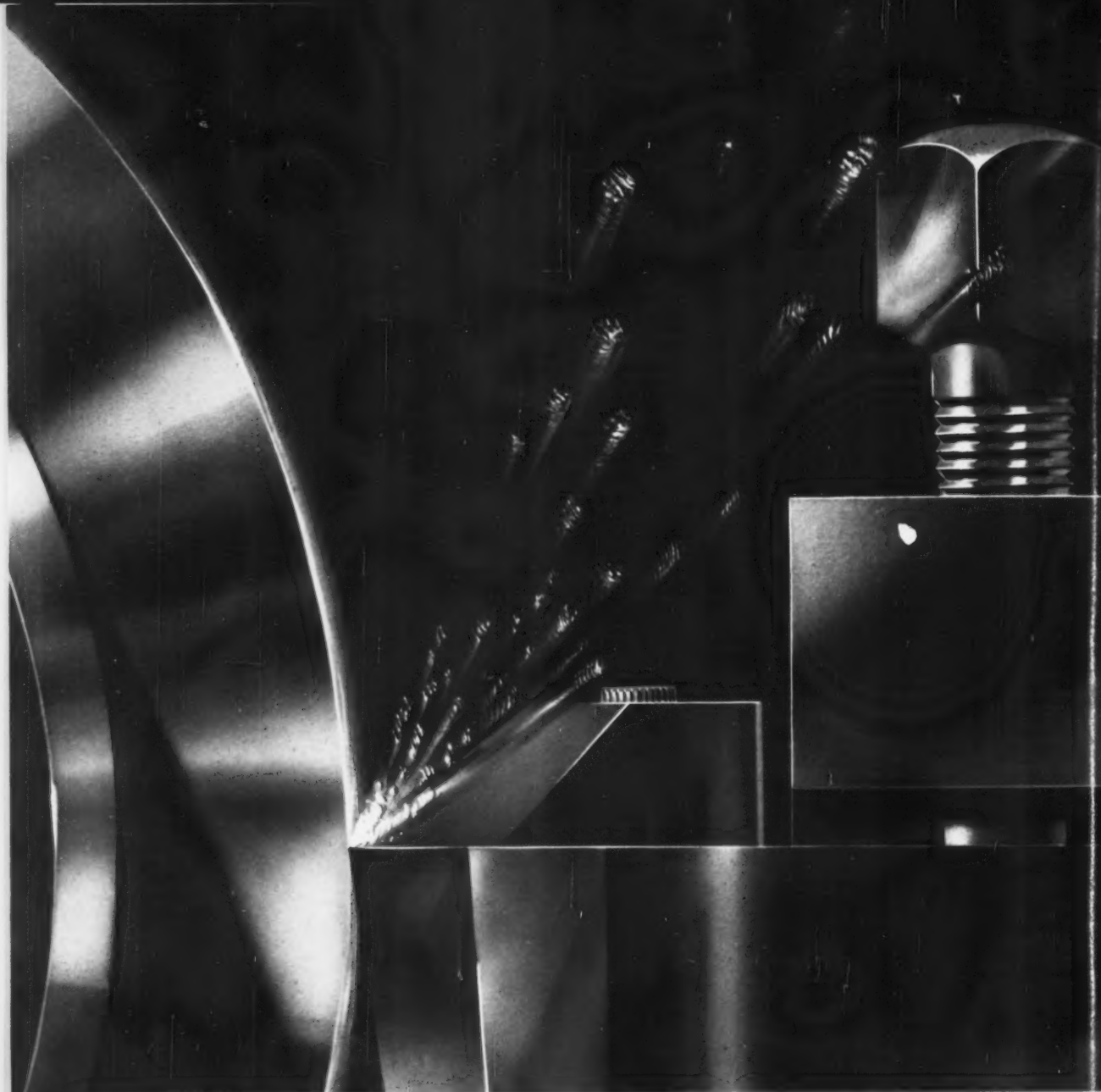


Illustration of Malleable casting being turned at 1,400 surface feet per minute with a 0.100" depth of cut using an oxide tool.

## Machinability is **Malleable**

It's the finished cost of machined components that's important to you. Remember then . . . Malleable iron is more machinable than any other ferrous metal of similar properties. With Malleable castings you'll reduce machining time as much as 50% . . . increase tool life up to 250% . . . get unexcelled surface finishes . . . and end your reject problems.

To find out how much you can cut your costs and improve your profits, contact one of the progressive firms that displays this symbol—

If you wish, you may inquire direct to the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio, for information.



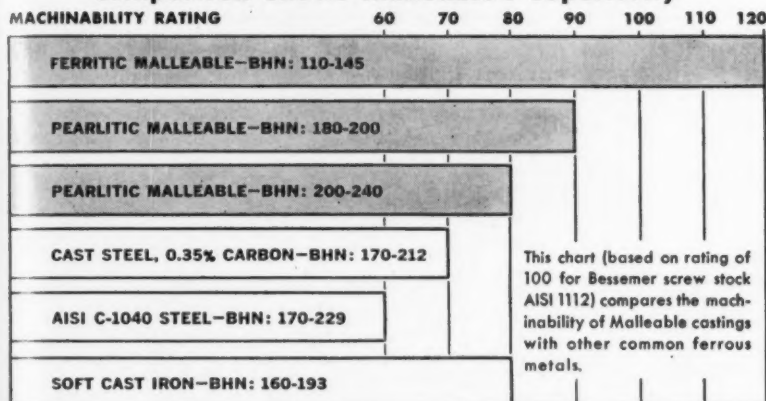
# Machining Malleable Castings—Important Key to Cost Reduction

**Malleable castings—the most machinable of all ferrous metals—cut quality components costs**

Production men know that machining time, power consumption and rejects drop with the use of Malleable iron castings, while tool life and profits shoot up. The reason is simple: Malleable iron is the most machinable of all ferrous metals of similar properties. The following important factors work together to give Malleable such machin-

ing superiority: Malleable's microstructure contains tiny, evenly distributed nodules of carbon that help cutting tools quickly break the removed metal into small (Class A) chips; the carbon also acts as a lubricant, prolonging tool life; uniformity of properties throughout every casting permits running at optimum machining conditions.

## Comparison Shows Malleable's Superiority



## Typical Example Shows Savings of 70% to 250%

The conversion of automotive universal joint yokes from steel forgings to pearlitic Malleable castings typifies the savings provided by Malleable castings. Costs for the rough pieces and performance characteristics of the two materials are comparable. However, the castings are much more economical to machine. Considering that machining often costs two to four times as much as the rough parts, the economy resulting from using Malleable castings is substantial.



Conversion of this universal joint yoke to a Malleable casting increased production, lowered direct and tool room labor, and cut tool replacement.

One volume user of Malleable joint yokes reports the following savings after changing from steel to Malleable castings: 70% longer tool life in broaching the splines; 250% more pieces cut by the nut seat cutters; 149% more pieces in turning and facing the hub; an increase of 100% in production between wheel dressings in grinding the hub; 246% greater production in drilling the cross holes.

In each of these operations, the change to Malleable castings cuts direct production time by reducing the frequency of tool changes. Tool room labor and tool replacement are both reduced to fractions of their previous costs.

Throughout the metalworking industry, part after part is now being initially designed of Malleable or converted from other materials to take advantage of Malleable's unrivalled machinability... to produce better parts at lower costs.

## New Information Now Available on Machining Malleable

Data Unit 106—Machinability of Malleable Castings—can be obtained from any member of the Malleable Castings

Council, or from the Malleable Castings Council, Union Commerce Building, Cleveland 14, Ohio.

These companies are members of the



### CONNECTICUT

Connecticut Mail Castings Co., New Haven 6  
Eastern Malleable Iron Co., Naugatuck  
New Haven Malleable Iron Co., New Haven 4

### DELAWARE

Eastern Malleable Iron Co., Wilmington 99

### ILLINOIS

Central Fdry. Div., Gen. Motors, Danville  
Chicago Malleable Castings Co., Chicago 43  
Moline Malleable Iron Co., St. Charles  
National Mail and Steel Castings Co., Cicero 50  
Peoria Malleable Castings Co., Peoria 1  
Wagner Castings Company, Decatur

### INDIANA

Link-Belt Company, Indianapolis 6  
Muncie Malleable Foundry Co., Muncie  
National Mail & Steel Castings Co., Indianapolis 22  
Terre Haute Mail & Mfg. Corp., Terre Haute

### MASSACHUSETTS

Belcher Malleable Iron Co., Easton

### MICHIGAN

Albion Malleable Iron Co., Albion  
Auto Specialties Mfg. Co., Saint Joseph  
Cadillac Malleable Iron Co., Cadillac  
Central Fdry. Div., Gen. Motors, Saginaw

### MINNESOTA

Northern Malleable Iron Co., St. Paul 6

### NEW HAMPSHIRE

Laconia Malleable Iron Co., Laconia

### NEW JERSEY

Meeker Foundry Company, Newark 4

### NEW YORK

Acme Steel & Mail. Iron Works, Buffalo 7  
Frazer & Jones Company Division  
Eastern Malleable Iron Co., Solvay  
Oriskany Malleable Iron Co., Inc., Oriskany  
Westmoreland Mail. Iron Co., Westmoreland

### OHIO

American Malleable Castings Co., Marion  
Canton Malleable Iron Co., Canton 5  
Central Fdry. Div., Gen. Motors, Defiance  
Dayton Mail. Iron Co., Ironton Div., Ironton  
Dayton Mail. Iron Co., Ohio Mail. Div., Columbus 16  
Maumee Malleable Castings Co., Toledo 5  
National Mail and Steel Castings Co., Cleveland 6

### PENNSYLVANIA

Buck Iron Company, Inc., Philadelphia 22  
Erie Malleable Iron Co., Erie  
Lancaster Malleable Castings Co., Lancaster  
Lehigh Foundries Company, Easton  
Meadville Malleable Iron Co., Meadville  
Pennsylvania Malleable Iron Corp., Lancaster

### TEXAS

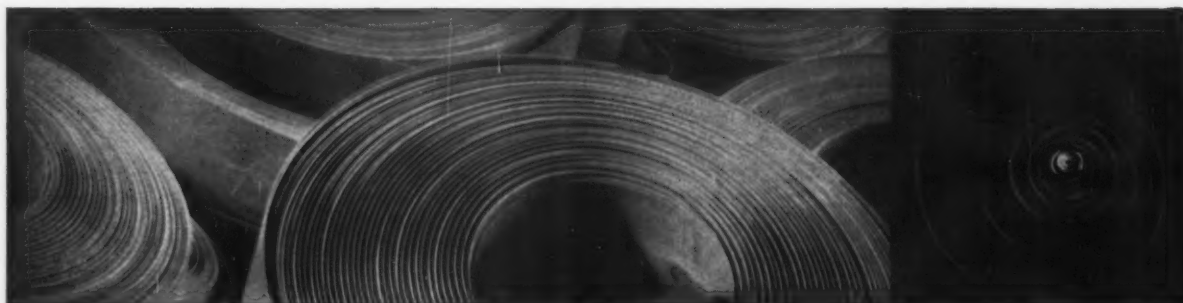
Texas Foundries, Inc., Lufkin

### WEST VIRGINIA

West Virginia Mail. Iron Co., Point Pleasant

### WISCONSIN

Belle City Malleable Iron Co., Racine  
Chain Belt Company, Milwaukee 1  
Federal Malleable Company Inc., West Allis 14  
Kirsh Foundry Inc., Beaver Dam  
Lakeside Malleable Castings Co., Racine  
Milwaukee Malleable & Grey Iron Works, Milwaukee 46



Check your requirements against these

## Wallace Barnes Cold-rolled Specialty Steels

Furnished in these carbon grades:

1.25 - 1.32% .90 - 1.05% .70 - .80% .59 - .74% .48 - .55%

### ANNEALED AND HARD-ROLLED

#### Thickness

.003 - .010" in widths $\frac{1}{8}$ to $6\frac{1}{4}$ "	.036 - .049" in widths $\frac{3}{8}$ to 13"
.011 - .014" " " $\frac{1}{8}$ to 11"	.050 - .064" " " $\frac{1}{2}$ to 13"
.015 - .019" " " $\frac{1}{8}$ to 13"	.065 - .093" " " $\frac{3}{4}$ to $6\frac{1}{4}$ "
.020 - .035" " " $\frac{1}{4}$ to 13"	.093 - .125" " " $\frac{3}{4}$ to $6\frac{1}{4}$ "

### HARDENED AND TEMPERED

Scale-free or scaleless; polished\*; polished and blued\*; polished and strawed\*

#### Thickness

.003 - .004" in widths $\frac{1}{8}$ to 2"	.031 - .035" in widths $\frac{1}{4}$ to 7"
.005 - .007" " " $\frac{1}{8}$ to 3"	.036 - .040" " " $\frac{3}{8}$ to 7"
.008 - .009" " " $\frac{1}{8}$ to 4"	.041 - .049" " " $\frac{3}{8}$ to 6"
.010 - .014" " " $\frac{1}{8}$ to 5"	.050 - .060" " " $\frac{1}{2}$ to 4"
.015 - .019" " " $\frac{1}{8}$ to 7"	.061 - .064" " " $\frac{1}{2}$ to 3"
.020 - .025" " " $\frac{1}{4}$ to $8\frac{1}{2}$ "	.065 - .093" " " $\frac{3}{4}$ to 3"
.026 - .030" " " $\frac{1}{4}$ to 8"	

\*Maximum width for polishing in .010 - .030 thickness ranges is 5 in.

Facilities for processing alloy steels also are available.

Standard sizes normally available for prompt shipments.

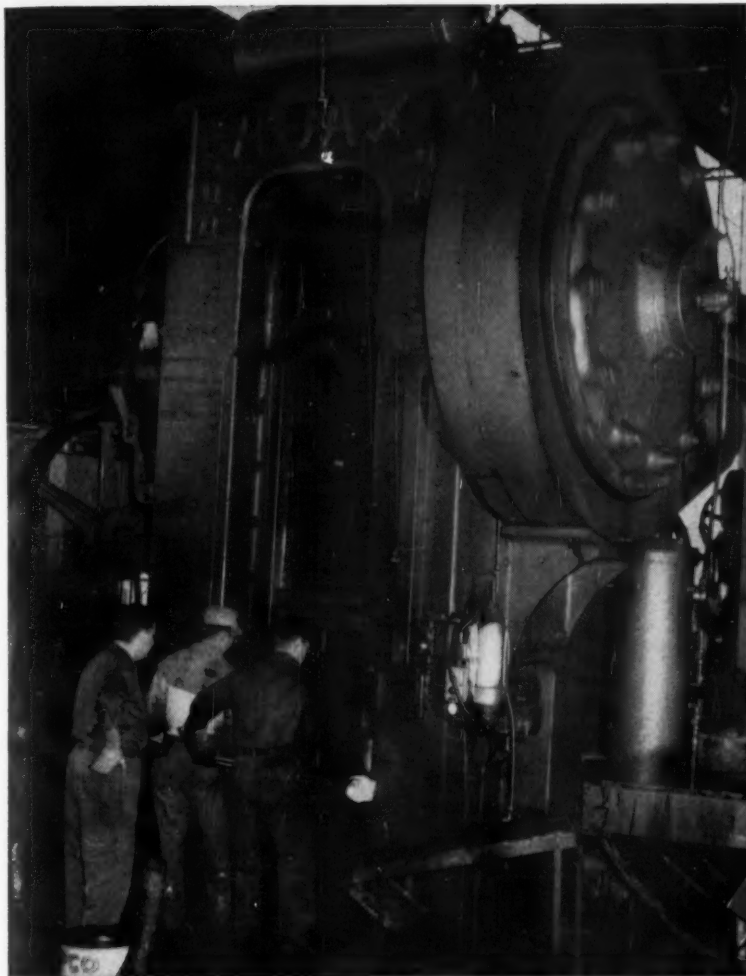
Write for a copy of "Physical Property Charts" that give performance characteristics of .90 - 1.05% and .70 - .80% carbon grades.

**Wallace Barnes Steel Division**

Bristol, Connecticut



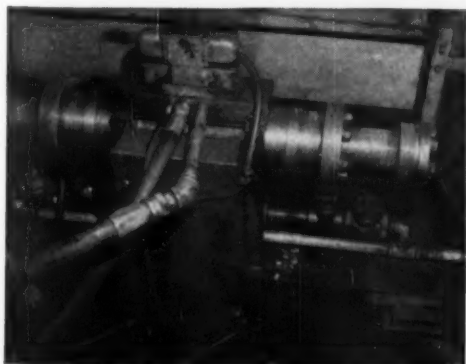
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# Aeroquip Hose Lines Give Long, Trouble-Free Performance

AT JACKSON DROP FORGE COMPANY

Hot billets withdrawn from the furnace pass through the water descaler at the right before forging. Arrow points to Aeroquip Hose Lines.



Aeroquip 1509 High Pressure Hose Lines on the billet descaler are subject to hydraulic pressures up to 2,500 psi.

## Rugged Aeroquip 1509 Hose Lines in Good Condition After 2½ Years on Billet Descaling Unit

Use of high quality Aeroquip Flexible Hose Lines assure full service life of fluid lines on all types of metal-working equipment.

At Jackson Drop Forge Company, Jackson, Michigan, Aeroquip 1509 Hose Lines have performed well on the high pressure hydraulic systems used on special billet descalers. These hose lines withstand pressure surges, heat, oil soaking and vibration. They are in good condition after 2½ years' service.


Whatever your fluid system requirements, you can depend on your Aeroquip Distributor to provide replacement hose lines that will do the job. Call him today; he's listed in your Yellow Page Phone Directory.

New Industrial Catalog No. 204 is now available, covering the complete line of Aeroquip Hose, Fittings, Adapters and Quick-Disconnect Couplings. Write for your copy.



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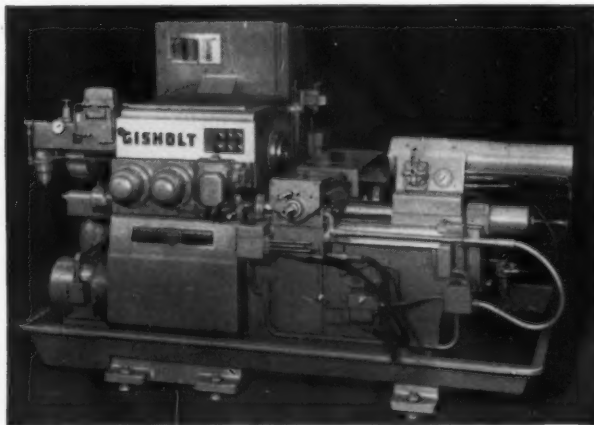
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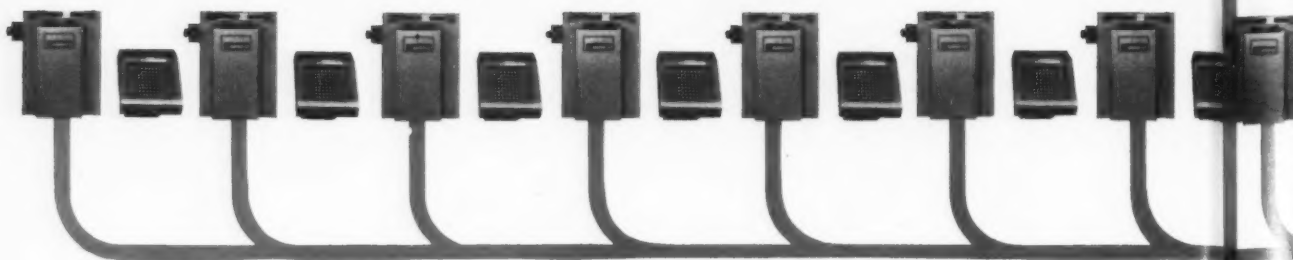
Your Gisholt Representative will gladly show you how the No. 12 Automatic Chucking Lathe will pay for itself in your plant. Call him, or write for Bulletin 1213.

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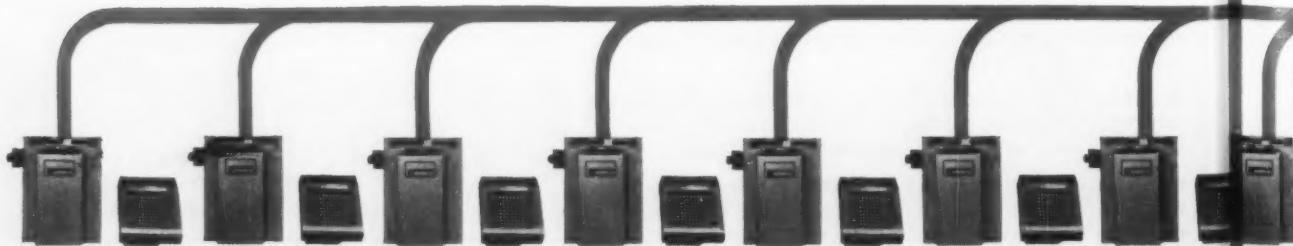
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**Lighten your work** This special flat car holds seven laminated wood arch sections which extend 25 feet over the end of the car. Rilco Laminated Products, Inc., Albert Lea, Minnesota, found they could make substantial savings in loading by using USS Steel Strapping and Tools. Formerly a car required four sets of wooden supports, and loading took 12 man-hours per car. With USS Steel Strapping and Tools, at least two, sometimes three, sets of supports are eliminated, and two men can load the car in two hours. In addition to this saving, both delivery and unloading are faster.



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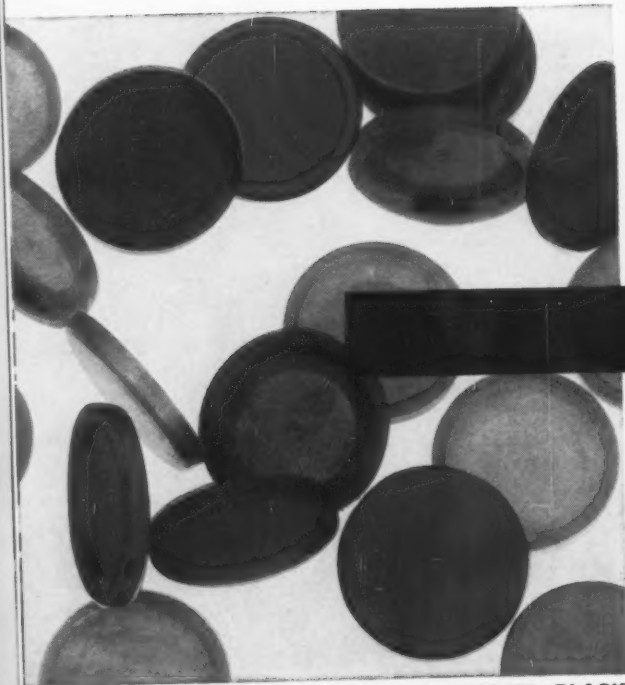


**Brighten your customer relations** Even more pleasing to your customers than quick delivery is the fact that material is delivered undamaged. On this job, 2" x .050" USS Flat Steel Strapping does its part to achieve this. It has the proper elastic qualities to absorb shock during travel. The uniformity of its grain structure eliminates soft spots which might tear, and its ductility permits it to conform to corners without weakening. Rigid adherence to width and gauge tolerances give the strap high and consistent seal efficiency. USS Flat Steel Strapping helps cut damage claims drastically.

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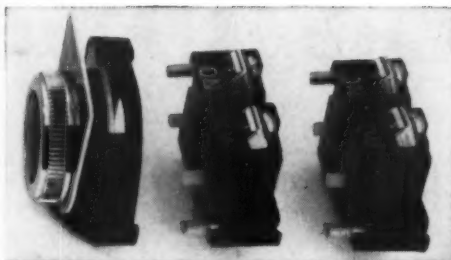
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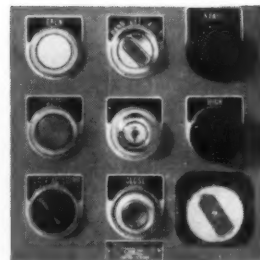
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# WESTINGHOUSE FLUSH PUSHBUTTON

puts the finger  
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with snap-on  
color caps



Shallow contact blocks stack for multiple control circuits. Angled terminals are easy to get at with a screwdriver, even when blocks are stacked.



Available in a full range of operator designs.

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Simplified color coding is but one of the many pluses for new Westinghouse flush pushbuttons. Thin operator and shallow contact blocks make this pushbutton *thinnest overall*. Contact blocks stack for control of multiple operations, another space-saving feature.

Flush pushbuttons are oiltite, of course. And they meet exacting machine tool and control panel requirements. Available in a full range of operator designs.

Regardless of your pushbutton requirements, order with confidence from industry's most extensive line. Contact your nearby Westinghouse sales office or distributor, or write: Westinghouse Electric Corporation, Standard Control Division, Beaver, Pa.

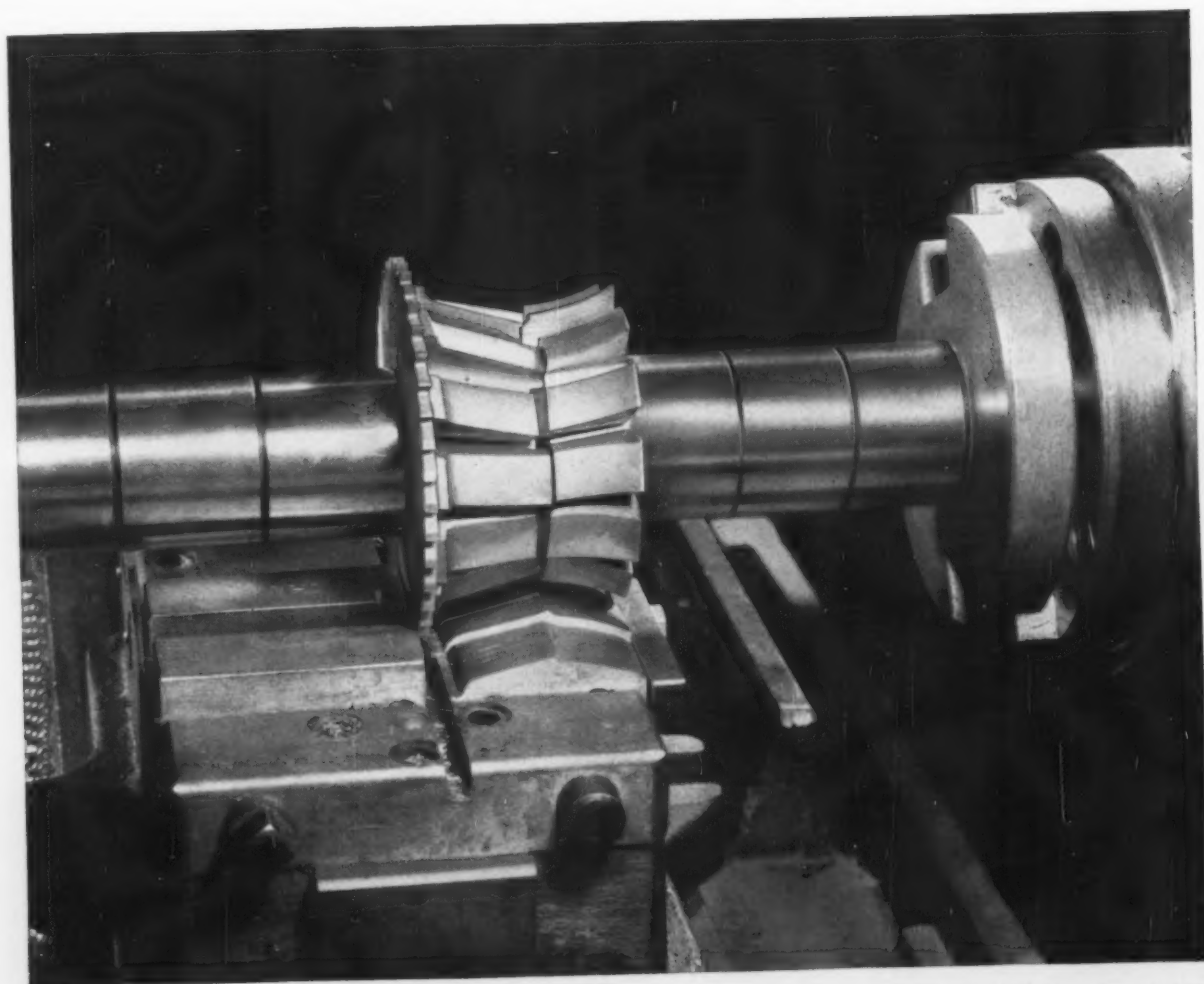
J-30304

YOU CAN BE SURE...IF IT'S **Westinghouse**

WATCH "WESTINGHOUSE LUCILLE BALL-DESI ARNAZ SHOWS" CBS TV FRIDAYS

# Mill Odd Shapes in One Operation

...with Barber-Colman Form-Relieved Cutters



Milling is the best way to produce accurate, irregular forms with a minimum of tooling expense. But, when you get down to cases, much depends on the design and quality of the milling cutter used.

Barber-Colman Company will manufacture a cutter from your part or print for almost any form. In it will be designed all the factors needed to upgrade production efficiency and work quality.

Take this small part, for example. As shown on the drawing, there are two opposed surfaces that require machining at right angles to the cutter axis. For efficient milling at these points, the teeth must have both left-hand and right-hand axial relief. This design problem was solved by making the tool interlocking, with axial relief in both directions. Right-hand and left-hand helical flutes assure smooth cutting action and fine finish.

The cutters are *unground*. Yet, all dimensions are held to a maximum tolerance of  $\pm .002$  in. Angular surfaces are held to  $\pm 30$  minutes. A separate cutoff operation was eliminated by ganging a metal-slitting saw with the form cutters.

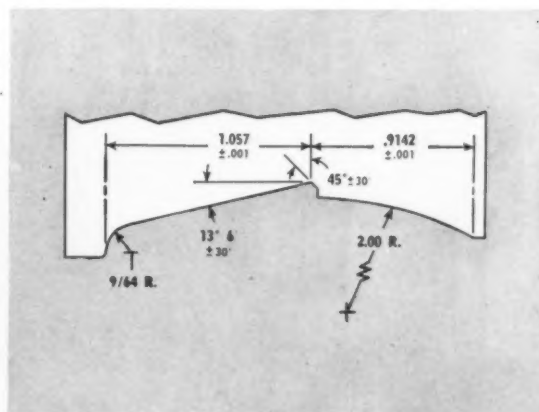
Thus, fine finish and high accuracy were provided at the lowest possible cost and with a minimum tooling expense.

### Five types of engineering . . .

These Barber-Colman engineering and manufacturing capabilities can be added to your own in finding better solutions to milling problems:

1. *Application engineering* — on-the-spot evaluation of milling problems by experienced tool designers.
2. *Design engineering* — highly specialized tool engineering, backed by electronic computers for fast, accurate calculation of complex tooth forms.
3. *Metallurgical engineering* — specially selected steels and heat treatment for your particular material and tool geometry.
4. *Manufacturing* — the most complete and advanced processes under one roof for producing exactly the right finish, highest accuracy, and any cutter style.
5. *Quality control* — optical master inspection, seven different control stations, and numerous separate inspections for individual cutters.

If you are producing irregular parts by shaping, crush grinding, or milling, it will pay you to let a Barber-Colman milling cutter engineer look at the job. He will show you how to combine the maximum number of operations in a single cut with lowest possible tool cost. Call your Barber-Colman sales office or Rockford — TR - 7-5741.



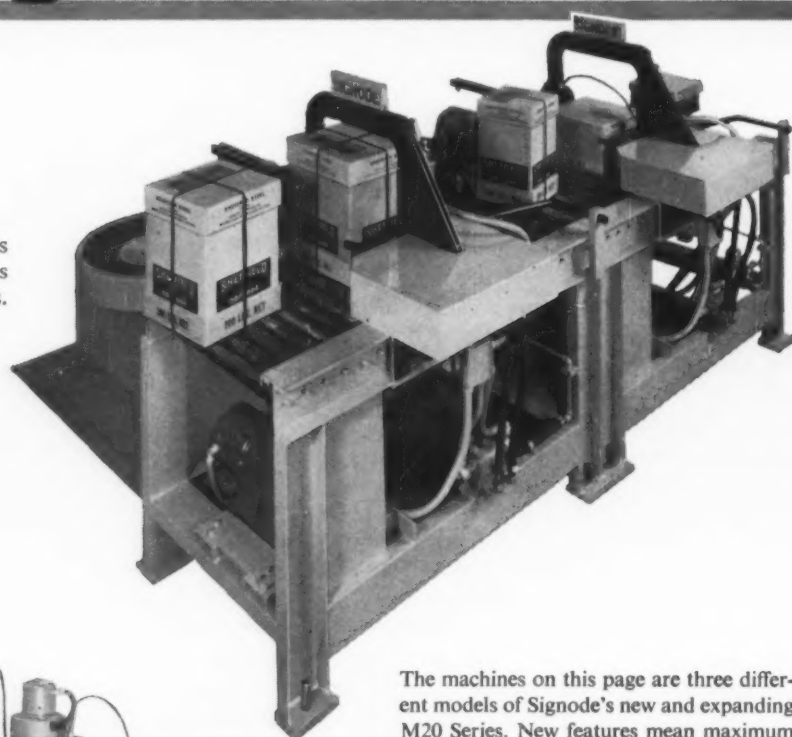
Barber-Colman Company



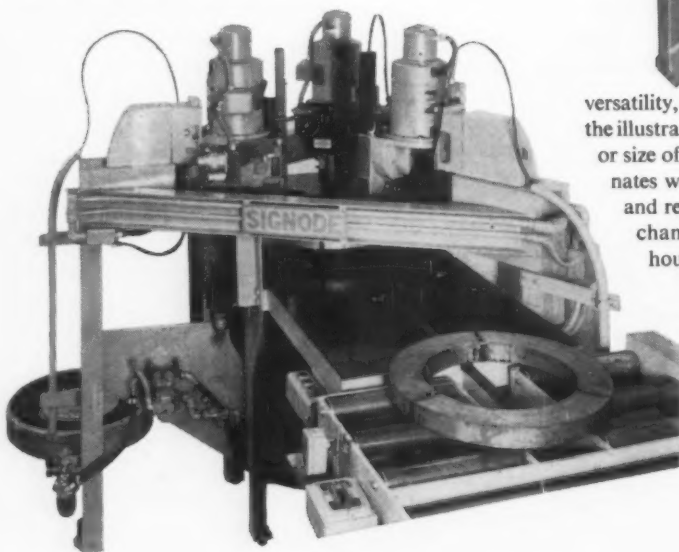
1110 Loomis Street, Rockford, Illinois

# Signode machines

Operatorless  
cross-strapping of nail cartons  
in mixed sizes.

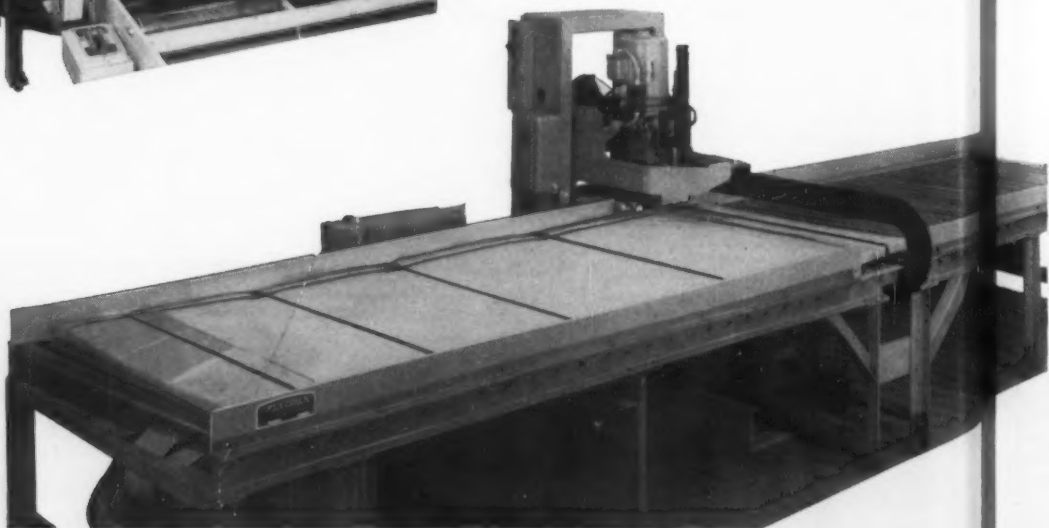


Operatorless strapping of strip  
steel coils, 3 straps simultaneously,  
up to 1,000 coils per hour.



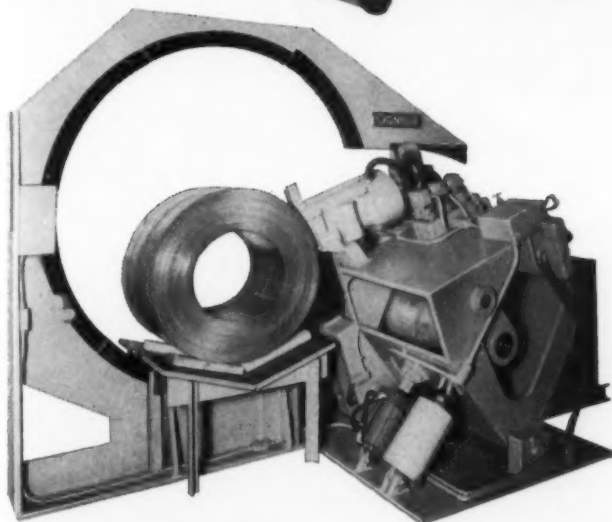
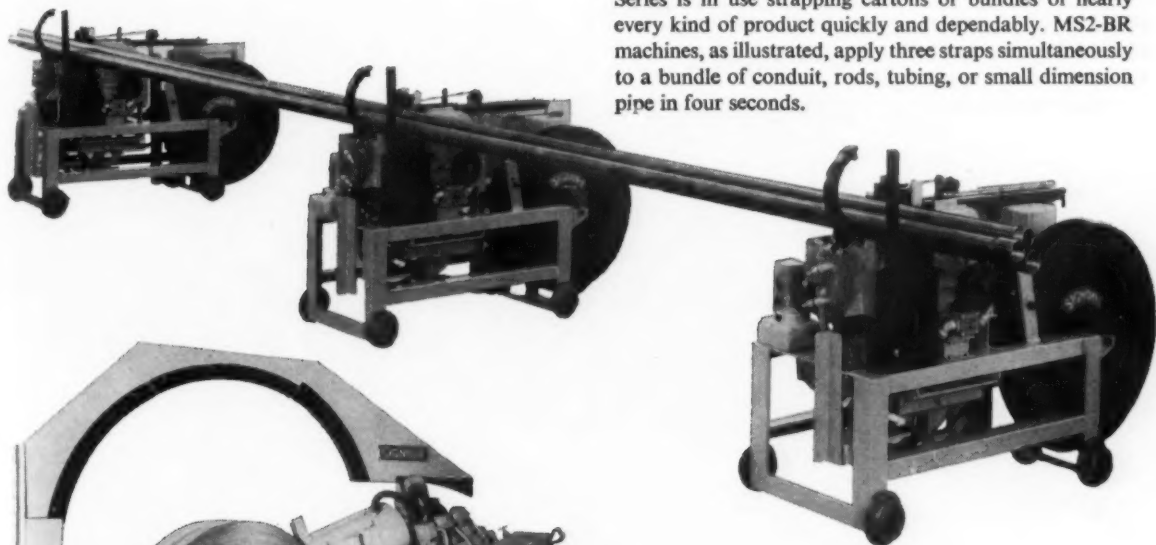
The machines on this page are three different models of Signode's new and expanding M20 Series. New features mean maximum versatility, long trouble-free life, and minimum maintenance. As the illustrations show, automatic strapping of practically any shape or size of bundle or container is possible. Overlap control eliminates waste of strap. Tension is easily and accurately pre-set, and requires no further adjustment unless type of package is changed. Vital working parts are protected by a sealed housing and run in a bath of oil. With an M20, strapping can be applied vertically or horizontally...any type of Signode PSM grade strapping can be used, in sizes from  $\frac{3}{8}$ " to  $\frac{3}{4}$ ". Seals can be lithographed with your trademark in color. Operation can be completely automatic (operatorless), or semi-automatic (push-button controlled).

Operatorless strapping  
of plastic sheet packs.  
Number of straps  
per pack is optional.



# reduce packaging costs

Push-button strapping of pipe. This "work horse" M2 Series is in use strapping cartons or bundles of nearly every kind of product quickly and dependably. MS2-BR machines, as illustrated, apply three straps simultaneously to a bundle of conduit, rods, tubing, or small dimension pipe in four seconds.



Operatorless circumferential strapping of aluminum coils. Strapping is automatically centered on coils from 30" to 72" O.D. Capacity is 300 to 400 coils per hour. Other MH Series machines put 300 to 360 straps per hour on hot or cold strip steel coils or rod or wire coils...have been proved dependable in as much as ten years of the hardest kind of steel mill service.

## Every day hundreds of plants prove their economy and dependability

Signode machines strap faster and at less cost—and do it dependably, with uniform tension on every strap. Tensionable steel strapping is low in cost to begin with...and high in strength to ship with. Signode has unparalleled experience in building and applying over 30 different types of these machines. Improved flow, less waste, better handling, safer transit, and lower costs nearly always result. Signode Service includes operator training and fast mechanical service on a local basis, nationwide. All of these machines are available on either an annual rental or single payment basis. It will pay you to talk to the Signode man near you, or write:



*First in steel strapping*

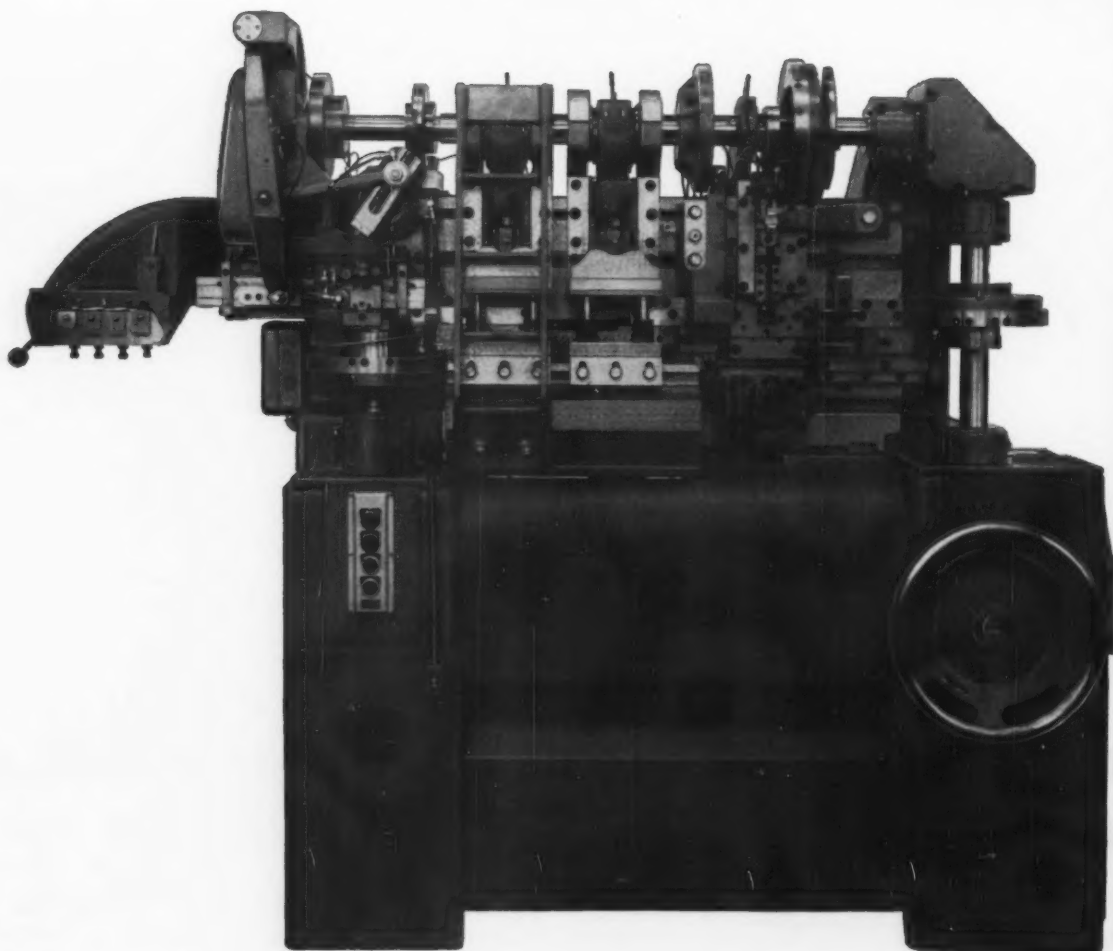
### **SIGNODE STEEL STRAPPING CO.**

2623 N. Western Avenue, Chicago 47, Illinois

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide  
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto

ON ITS  
FIRST  
PRODUCTION  
JOB THIS  
REVOLUTIONARY  
MACHINE...

---



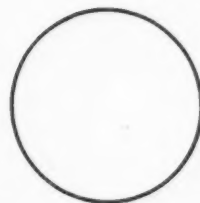
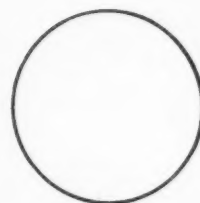
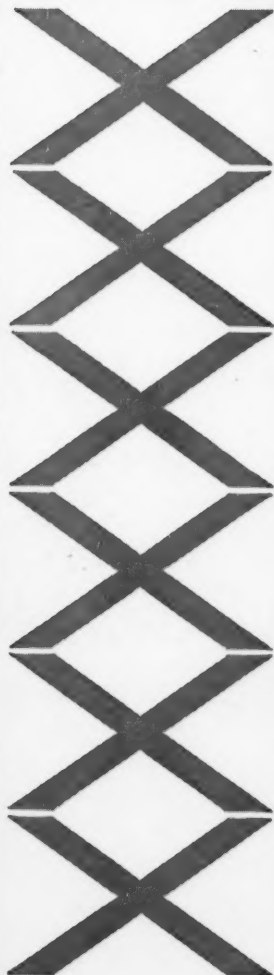
It's the sensational Torrington **Verti-Slide**, a most important new production tool. This amazing new vertical four-slide machine promises a genuine revolution in the **high-speed, high-precision, low-cost production** of just about everything in strip or wire that is now being produced on progressively tooled forming presses or conventional four-slide machines. Write or call today for complete technical data—or a Torrington sales engineer.

**THE TORRINGTON MANUFACTURING COMPANY**  
TORRINGTON, CONNECTICUT • VAN NUYS, CALIFORNIA • OAKVILLE, ONTARIO

**DID THE WORK  
OF SIX  
PROGRESSIVELY  
TOOLED  
FORMING PRESSES...**

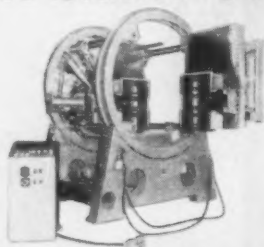
**AT  
FOUR TIMES  
THE  
SPEED...**

**AND  
ONE-THIRD  
THE COST!**





The Shalco Corporation, pioneers in Shell Core Blowers and Shell Molding Machines, joins forces and becomes a Division of the National Acme Company, pioneers in automatic multiple-spindle bar and chucking machines





# The National Acme Company

EXECUTIVE OFFICES: 170 EAST 131st STREET, CLEVELAND 8, OHIO • GLENNVILLE 1-9080

## To The Foundry Industry:

Our "Zone of Responsibility" to the metalworking industry is constantly being broadened to include almost every production step from raw material to the finished product. In joining forces with National Acme, Shalco's exclusive developments and broad experience in the art of shell molding is combined with 75 years' experience in automatic machine tool manufacturing and servicing. The result is shell molding equipment built to the highest standards of machine tool precision and reliability.

Shalco's unique design and manufacturing techniques have resulted in low cost, greatly simplified Shell Core Blowers and Shell Molding Machines with unusual flexibility. We believe this outstanding equipment will now allow the Foundry Industry to take greater advantage of the economy, precision and high quality realized with shell molded castings.

One of the most complete engineering and application services in the industry is available to assist foundrymen everywhere in obtaining optimum results from this outstanding process.

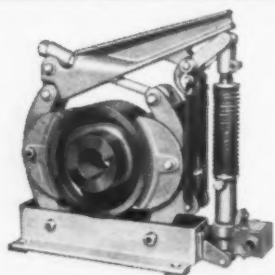
President  
The National Acme Company

AUTOMATIC BAR AND CHUCKING MACHINES/THREAD CUTTING HEADS/THREAD ROLLING HEADS AND MACHINES/LIMIT SWITCHES/SOLENOIDS/PUSHBUTTON CONTROL STATION SWITCHES/CONTRACT MANUFACTURING/SHELL CORE BLOWERS AND SHELL MOLDING MACHINES/SAND COATING EQUIPMENT/CORE BOXES/RELATED FOUNDRY SUPPLIES

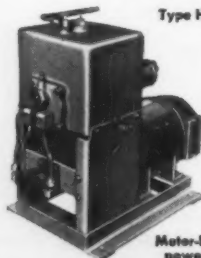
# National Acme

**PICK-UP FOR  
PRODUCTIVITY...**

**Install  
WAGNER  
POWERED  
Hydraulic  
Brakes on  
busy Cranes**



Type HM Brake



Motor-Driven  
power unit



Tiploc  
control valve

Some of your cranes are VIP's (very important producers). You can increase productivity by equipping these busy cranes with Wagner *Powered Hydraulic Crane Bridge Brakes*. Powered hydraulic braking gives safer, more efficient operation where frequent starts and stops are necessary . . . where close spotting is required . . . where heavy equipment is involved . . . for any extra busy heavy crane.

Your operators perform more efficiently, too, because there's far less fatigue. The operator stops the crane with the easy touch of a toe on a button while his heel rests comfortably on the floor. Several brakes can be operated from one pedal.

These power units can be added to your present Wagner Hydraulic System. Let your nearby Wagner Sales Engineer tell you how easy, fast, and economical such an installation can be. There are Wagner branches in 32 principal cities.

**Wagner Electric Corporation**  
6403 Plymouth Ave., St. Louis 14, Missouri.

SERVING 2 GREAT GROWTH INDUSTRIES...ELECTRICAL...AUTOMOTIVE

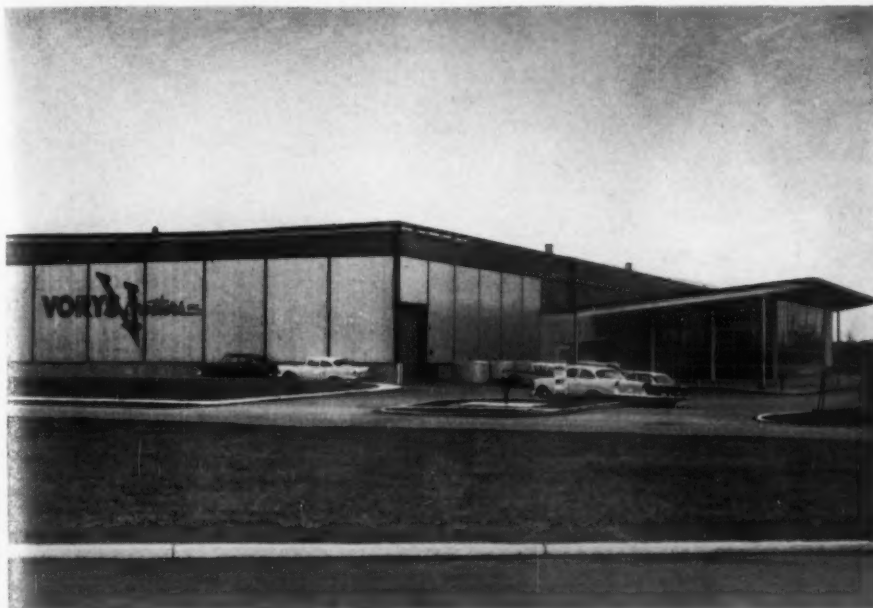
W159-4

# handsomely restyled . . .

with the help of a local Steel Service Center



Oasis dehumidifier by Ebco Manufacturing Company, Columbus, Ohio, was restyled with a gold anodized grille of Penmetal Garland expanded aluminum.



Garland expanded aluminum is one of a number of exciting new meshes recently introduced by Penn Metal Company.

In restyling Ebco's Oasis dehumidifier, much consideration was given to the type of grille to be used. It was decided that one of the new Penmetal expanded metal meshes would impart the fresh, contemporary appearance desired.

The specified mesh . . . Penmetal's Garland pattern . . . was on hand at the Vorys' Brothers warehouse, Columbus, Ohio. Because the stocks at this *Steel Service Center* are always complete and up to date, the order was processed and delivered promptly.

When you need expanded metal, call your nearby *Steel Service Center* with the assurance of personal attention by specialists who make your problems their own.

## PENN METAL COMPANY, INC.

Expanded Metal Sales Office: P.O. Box 1460, Parkersburg, W. Va.  
AXminster 5-4521

Executive Offices: 40 Central Street, Boston 9, Mass.

Plant: Parkersburg, V. Va.

District Sales Offices: Boston, New York, Philadelphia, Pittsburgh, Chicago, Detroit, Dallas, Little Rock, Seattle, San Francisco, Los Angeles, Parkersburg, St. Louis



PM-227



Now! Tests prove  
**CONTOUR-WELDED\* STAINLESS TUBING**  
*gives products better protection against contamination*

This tubing is smoother inside — so there's less danger of product incrustation. And this means better protection against contamination. Not only that, a smoother surface also ensures greater resistance to corrosion and longer fatigue life.

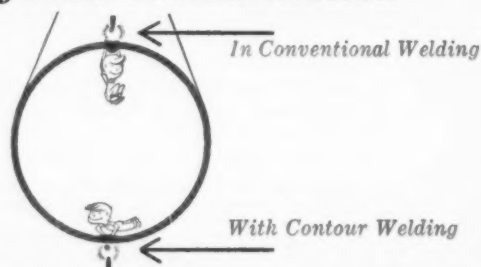
Here's why TRENTWELD® tubing, made by the exclusive *Contour-Weld* process, is smoother than any other tubing:

First, it's smoother than seamless tubing because it's formed from uniformly rolled strip steel, whereas seamless is extruded or pierced.

Second, it's smoother than other welded tubing because the Trent-patented *Contour-Weld* process virtually eliminates the weld bead.

But get full details on why smoother tubing surfaces are vital. Send for the free 48-page "Trentweld Manual." It contains complete data on *Contour-Welded* tubing in stainless and high alloy steels, titanium, zirconium, zircalloy and Hastelloy†, in sizes from 1/4" to 40" O.D. Write: Trent Tube Company, Box 2518, Pittsburgh, Pa.

†Trademark Haynes Stellite Co.



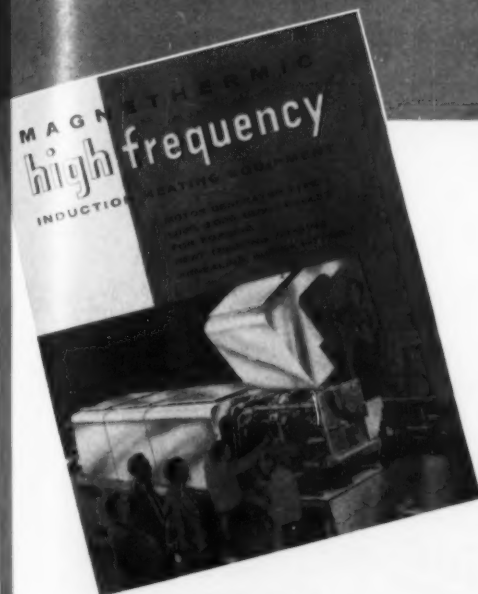
In CONVENTIONAL WELDING of tubes, gravity pulls the molten metal down to form a bead that is difficult to remove by cold working. And cold working may lead to undercuts, focal points for fatigue cracks and corrosive attacks. Cleaning becomes difficult.

With CONTOUR-WELDING the tube is welded at the bottom. Gravity still pulls the molten metal down inside the tube, but now the weld area corresponds to the contour of the tube. There's virtually no weld bulge on the inside surface. And even on the O.D., the weld seam more closely conforms to the contour of the tubing.



*stainless and high alloy pipe and tubing*  
**TRENT TUBE COMPANY**

Subsidiary of Crucible Steel Company of America • GENERAL OFFICES: East Troy, Wisc. • MILLS: East Troy, Wisc.; Fullerton, Calif.



**"I know Automatic Induction Heat Treating will cut my costs, *but WHO is the REAL AUTHORITY on the subject?*"**

As the only fully integrated company for induction heating, Ajax Magnethermic can give unbiased recommendations on the best method of heating and the highest quality material and workmanship—all at competitive prices.

This company devotes all facilities and energies exclusively to induction heating...and has for many years. We know the heating and specifically the induction heating business.

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*Induction Heating is our ONLY Business*

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Lower Cost . . . Cut Maintenance . . . Lengthen Die Life

**Lamina**

## BRONZE-PLATED GUIDE PIN BUSHINGS

Wring-Fit Bushings assure distortion-free assembly in die shoe.

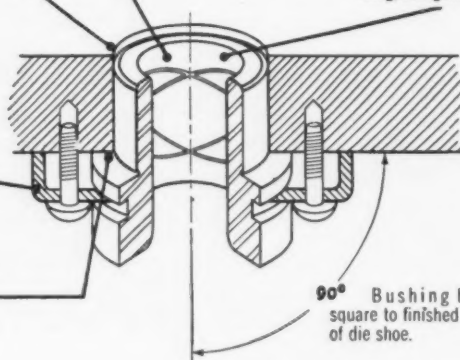
Bushing Bore is straight and concentric. Factory finished to Class 1, 2 or 3 fit to meet your requirements.

Bronze-Plate on hardened steel for strong, free-running, non-galling bushings.

Positive clamping provides holding strength of 2 to 5 times that of press fit.

Ground shoulder of bushing seats on finished surface of die shoe for positive alignment.

90° Bushing I.D. is square to finished surface of die shoe.



**L**AMINA bronze-plated, wring-fit guide pin bushings are honed on the I.D. for accurate geometry, precise dimensions and to provide the best surface finish for lubrication. Bushings are wring-fit in die shoe to assure distortion-free, full-bearing surface that results in better die alignment, less maintenance and longer die life. In addition the Lamina method of clamping bushings to die shoes provides holding strength of two

to five times that of press-fit bushings. For more accurate press operation, higher production and lower maintenance costs—standardize on Lamina, the originators of Bronze-Plated Guide Pin Bushings.

Lamina also manufactures: Steel Bushings and Guide Pins, Bronze-Plated Wear Plates, and Bronze-plated Parts. Complete facilities for the manufacture of steel or carbide precision dies (lamination, progressive, transfer, etc.).

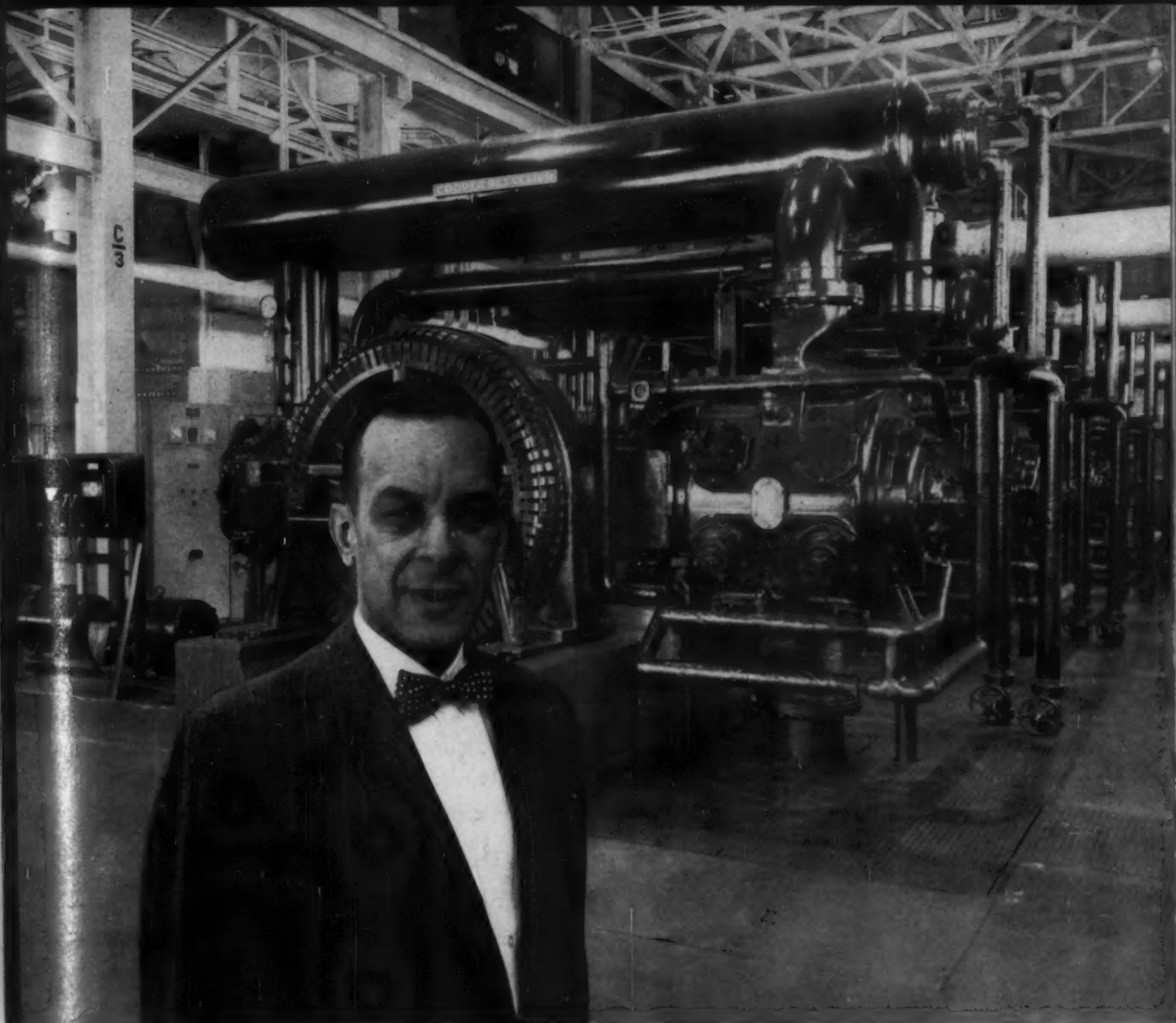


Lamina Bushings and Guide Pins are made in types and sizes to meet every requirement. More than 800 items are described and illustrated in our catalog—write for your free copy.

**Lamina**

**DIES AND TOOLS, INC.**

P. O. BOX 31, ROYAL OAK, MICHIGAN



Grover H. Detmer, *Project Engineer,*  
*The Cooper-Bessemer Corporation, explains...*

## How Cooper-Bessemer compressors supply air for Ford assembly

Compressed air plays an important part in the production operations of the new Ford assembly plant in Lorain, Ohio. Behind this supply, you'll find four 400 hp Cooper-Bessemer compressors with En-Tronic controls. Housed in the power plant building, these units discharge at 104 lbs. pressure. Mains of 8" size carry the air about 1000 feet to the far ends of the huge plant. Pressure there is 98 lbs. The 5-step capacity controls automatically load the compressors to meet plant demands for air.

The Cooper-Bessemer equipment has been in use constantly since the plant was completed a year ago and have given excellent service.

Cooper-Bessemer M-line compressors for industrial air supply are available in sizes from 200 to 10,000 hp. Write for free copy of Bulletin M-81, "Air for Industry."

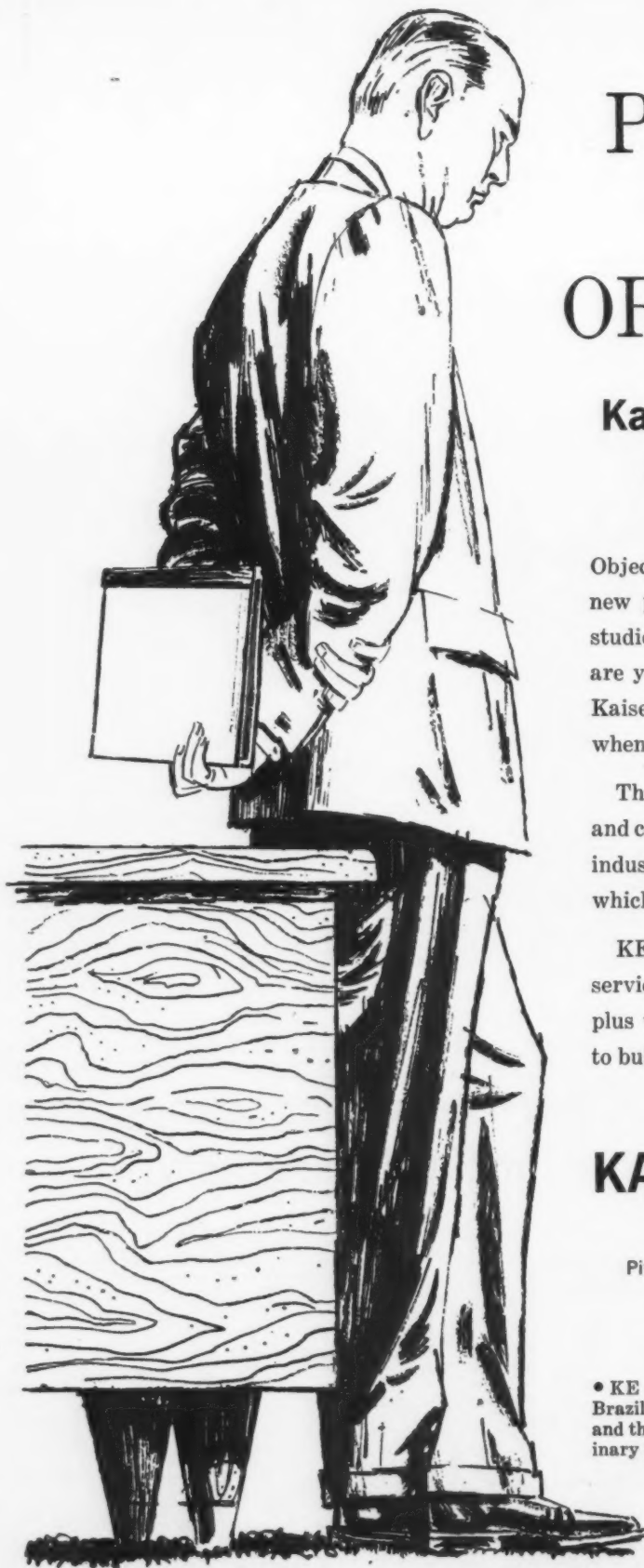
**BRANCH OFFICES:** Grove City • New York • Washington • Gloucester  
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**GENERAL OFFICES: MOUNT VERNON, OHIO**

**ENGINES: GAS • DIESEL • GAS-DIESEL  
 COMPRESSORS: RECIPROCATING AND CENTRIFUGAL  
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# PROCEED, DEFER OR MODIFY?

## Kaiser Engineers can help you decide

Objective analysis is vital to sound decision on new plant or expansion projects. Feasibility studies, economic analyses and site evaluations are yours by an outside, impartial firm when Kaiser Engineers is selected to help you decide when, how and where to proceed.

These services are in addition to the design and construction of major facilities for the Steel industry—including the proven L-D Process for which KE is the U. S. licensor.

KE offers complete, one-company, integrated service from concept through construction—plus world-wide experience and the ingenuity to build quickly, within budget.

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Division of Henry J. Kaiser Company

Oakland 12, California

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• KE projects include work in Argentina, Australia, Brazil, Formosa, Japan, New Zealand, as well as Canada and the United States. Assignments range from preliminary planning to plant construction.

5456-2



# \$37,000,000 ALCOA EXPANSION

## in ***NORTH CAROLINA***

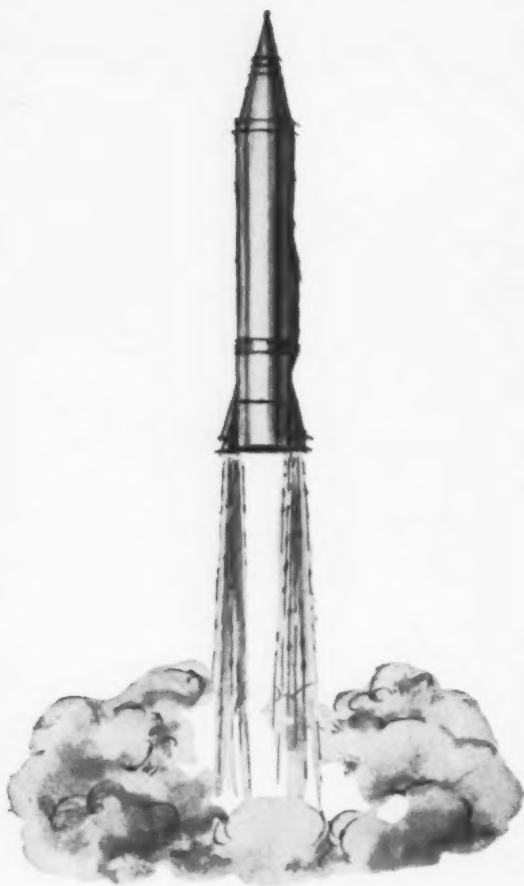
Alcoa is spending 37 million dollars to modernize and expand its aluminum smelting facilities at Badin and to construct a new dam which, along with three existing dams, completes the hydroelectric development of a 30-mile stretch of the Yadkin River.

The company's successful smelting operation at Badin since 1918 has provided sound reasons for this great expansion in North Carolina. Reason number one—North Carolinians

Their understanding and cooperation with industry's problems and their exceptionally high quality of production.

Other North Carolina valleys, small towns and communities, all within easy reach of cities, state and national parks, beaches, and mountains, are ready for new industry that will "better their future" and yours! Your industry will have their enthusiastic welcome and help. For prompt and confidential information, contact:

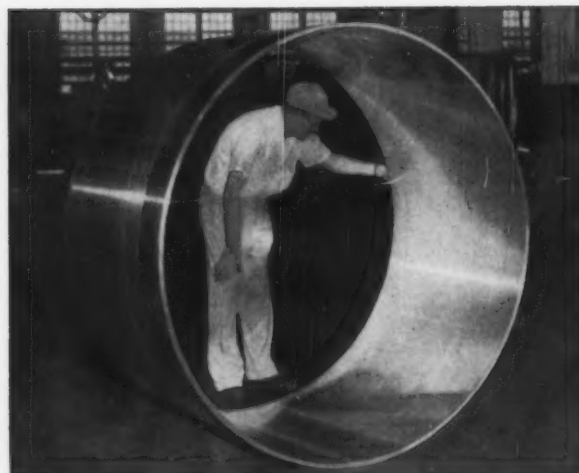
William P. Saunders, Director  
Department of Conservation and Development  
Raleigh, North Carolina



## QUALITY OF "MINUTEMAN" MISSILES PARTS DETERMINED BY STANDARD STEEL WORKS RESEARCH

Months of research and development of various rigid quality-control procedures at Standard Steel Works Metallurgical Laboratories preceded the delivery of "Minuteman" missiles parts of extremely high-quality material.

Standard Steel Works' laboratory facilities—second to none in industry—make possible delivery of unusual forgings from special steel alloys in record time. Missiles parts of the highest cleanliness ratings have been furnished from both air and vacuum melted steel. All are subjected to ultrasonic inspection under water for defects and to microscopic examination for cleanliness.



**First stage** motor case ring—vacuum-melted D6A steel



**Second stage** motor case ring—vacuum-melted 300M steel



**Third stage** motor case ring—air-melted AMS-256 steel

# Standard Steel Works Division

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BURNHAM, PENNSYLVANIA

Rings • Shafts • Car wheels • Gear blanks • Flanges • Special shapes





**Any Size  
Any Length  
Any Pressure  
Any Quantity  
Any Hose End Combinations**  
From the hose types  
and styles shown below

**BULK  
HOSE**

**FINISHED  
ASSEMBLIES**



depend on  
**WEATHERHEAD**  
for SERVICE and  
SATISFACTION  
on all industrial  
hose applications

#### STANDARD HOSES

##### LOW PRESSURE

H-9

H-100



SAE 30R2



COTTON COVERED

##### MEDIUM PRESSURE

H-17



SAE 100R3

##### HIGH PRESSURE

H-25



SAE 100R2

##### MEDIUM HIGH PRESSURE

H-69



SAE 100R5

##### MEDIUM HIGH PRESSURE

H-108



SAE 100R1

##### HIGH PRESSURE

H-35

H-50



Spiral Wire Reinforced

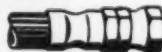
#### REUSABLE ENDS



##### STEEL

##### STANDARD 2-PC. END

For fast assembly and positive, leakproof connections. Designed for dependable performance under high pressure. Skive and no-skive.



##### CLAMP-TYPE



For most two-wire braid high-pressure hydraulic hose applications. No skiving of hose or special tools required.

##### BARB-TITE ENDS



Fast, easy push-on, stay-on hose ends for all types of low pressure applications. Sizes 1/4" to 3/4" I.D. Rugged and durable.

#### HOSE ASSEMBLIES

##### PERMANENTLY ATTACHED HOSE ENDS

Swaged or crimped permanently attached hose ends. Any quantity, any size, any type. 1/4" to 2". For all working pressures.



CRIMPED



SWAGED



TUBE-HOSE  
ASSEMBLIES

**THE WEATHERHEAD COMPANY**

FORT WAYNE DIVISION • Dept. IA-11, 128 West Washington Blvd.  
Fort Wayne, Indiana



# turn "overhead" into profit



Get full efficiency from manpower and space with a Trambeam Overhead Handling System. No delays from floor traffic . . . no wide aisles necessary . . . dead overhead space becomes a profitable area. Add to these advantages Trambeam extras: (1) High-carbon runway and girder rails deliver a smooth ride (2) Double-row tapered roller bearings in wheels reduce downtime, wear longer (3) Rubber drive wheels produce greater tractive effort (4) Hanger rod is ball and socketed at *both* ends to minimize bending fatigue. Whatever your overhead handling needs, call on Whiting for complete job analysis and cost-saving recommendations.

**FREE BOOKLET . . .** See how Trambeam increases storage capacity, speeds handling at famous new award-winning plant! Write for Bulletin M-33 today! *Whiting Corporation, 15601 Lathrop Avenue, Harvey, Illinois.*



**75th year**

COST-**SAVING** EQUIPMENT . . . THE WAY TO HIGHER PROFITS..



# WHITING

**This FALK drive saves  
\$296 a year over this**

## Here's proof of economy with FALK Shaft Mounted Drives

**PROBLEM**—For many years, a prominent Eastern abrasives manufacturer\* experienced high maintenance and down-time costs, as well as excessive noise and vibration, in the operation of 19 pebble mills driven by open spur gears. Drive gears and jack shaft pillow blocks required frequent repairs or replacement, and trunnion shafts often failed, due to radial overloading of the bull gear when broken pinion teeth bottomed between gear teeth.

**SOLUTION**—After numerous unsuccessful approaches to these problems, the solution was found by mounting a Size 315J FALK Shaft Mounted Drive directly on the mill drive trunnion. This eliminated objectionable gear noise and vibration...greatly reduced costly down-time and loss of production...and cut annual maintenance and replacement expenses as indicated by the following figures taken from the customer's records:

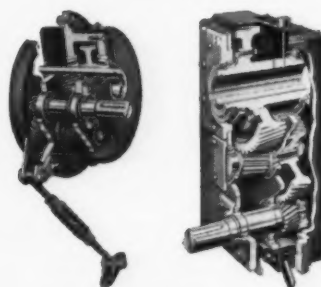
Spur Gear-and-Pinion Drive	FALK Shaft Mounted Drive
Bull Gears.....\$ 56	VEE Belts.....\$ 30
Pinions.....120	FALK Shaft
Pillow Blocks.....90	Mounted Drive
VEE Belts.....30	(based on
Trunnion (5-year life)....100	10-year life).....70
Annual cost <u>\$396</u>	Annual cost <u>\$100</u>
	<b>ANNUAL SAVINGS \$296</b>

**IF OBSOLETE DRIVES ARE COSTING YOU MONEY**, a change to Falk All-Steel Shaft Mounted Drives can effect important savings in money and production. Used on almost any type of machine, these compact, rugged units are establishing new standards of economy and efficiency in many industries. Specify FALK Drives on your purchased equipment...For full details, write for Bulletin 7100.

\*Name on request

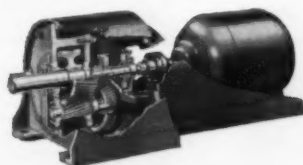
**THE FALK CORPORATION, MILWAUKEE 1, WISCONSIN**  
MANUFACTURERS OF QUALITY GEAR DRIVES AND FLEXIBLE SHAFT COUPLINGS  
Representatives and Distributors in Most Principal Cities

To get the right drive for your application, specify FALK®



### SHAFT MOUNTED DRIVES

Horizontal or vertical units— $\frac{1}{2}$  to 50 hp—420 to 5 rpm—single and two double reduction ratios—output torque ratings up to 41,000 lb-in (consult factory for higher torque capacity).



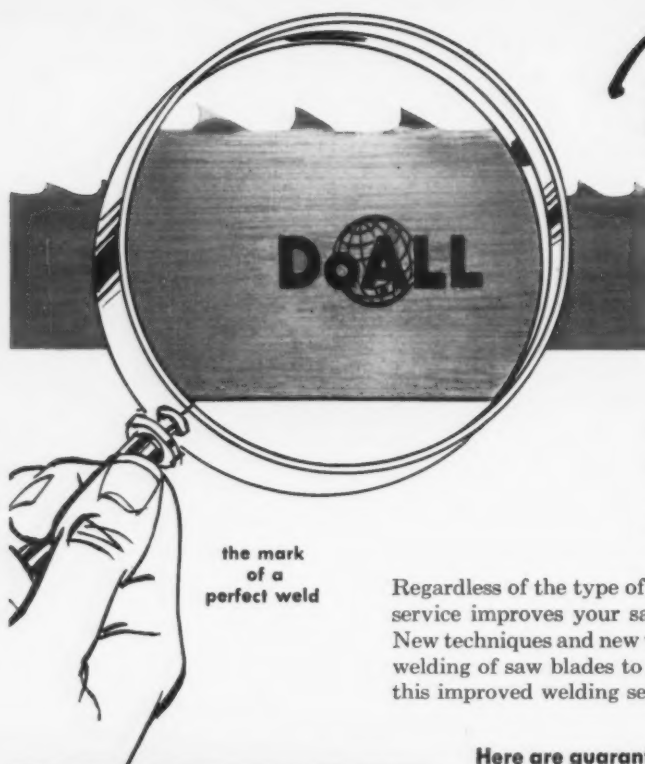
### ALL-MOTOR® MOTOREDUCTORS

Sizes up to 75 hp—furnished with or without standard foot-mounted motor—standard output speeds 1.2 to 520 rpm (with 1750 rpm motors)—ratios as high as 54,000:1 in semi-standard designs. Integral units (gearmotor type) also available. Ask for Bulletin 3100.

FALK Drives are available from factory and distributor stocks from coast to coast. Consult your Falk Representative or Distributor.

# FALK

...a good name in industry



the mark  
of a  
perfect weld

# Now

**YOU GET GUARANTEED  
BETTER PERFORMANCE  
... on any type of  
band sawing machine!**

**DoALL's New Perfection in  
Saw Band Welds Gives You  
3 1/3 Times Longer FLEX LIFE**

Regardless of the type of machine you use, this new DoALL saw blade welding service improves your sawing applications and reduces your saw blade costs. New techniques and new welding equipment—developed by DoALL for custom-welding of saw blades to specified lengths—assure you of a superior weld. Yet, this improved welding service is offered at no increase in price.

**Here are guaranteed advantages of DoALL marked weld:**

- 1. Welds are stronger** than the welded areas produced by any other equipment available. This is important because all saw bands must be joined by welding. And the tool is no better than the welded section. The DoALL identification stamped in the welded area is your positive guarantee of a better weld.
- 2. Teeth are perfectly matched.** Mismatched teeth are a thing of the past. So are uneven welds and weld breakage. A uniform cutting edge with no off-beat spacing of teeth insures smoother performance, maximum precision at all times. This perfection of weld and the guarantee of tooth set, hardness and tooth form make DoALL saw bands ultra-precision cutting tools.
- 3. No undercut by grinding wheels.** Note the upper illustration at left. This undercutting is typical of what happens when the welding flash is removed by grinding wheels. The thinner section and annealing caused by grinding heat are responsible for many saw band failures. The DoALL weld shown below it is smooth and uniform and will not "click" as it goes through the guides.
- 4. Saves you money . . . cuts welding costs.** This new DoALL custom-welding service costs less than doing it in your own shop. Each band is clearly marked as to blade type, width and pitch so that the operator can positively identify the right tool for the specific job. This service, covering both carbon and high-speed steel blades, is available *only* through your local DoALL store. Orders are filled promptly. Telephone your local DoALL store today.



58-60



THIS IS A  
TYPICAL DoALL STORE

**The DoALL Company, Des Plaines, Illinois**





46 x 90 inch Universal Slabbing Mill at the Fontana Works of Kaiser Steel Corporation.

## BLAW-KNOX UNIVERSAL SLABBING MILLS

Blaw-Knox designs and builds slabbing-blooming mills in a complete range of sizes in universal and high lift types. Other Blaw-Knox equipment for the metals industry includes complete rolling mill installations and auxiliary equipment for ferrous and non-

ferrous metals, iron, alloy iron and steel rolls, Blaw-Knox Medart cold finishing equipment, carbon and alloy steel castings, fabricated steel plate or composite design weldments, steel plant equipment, and heat and corrosion resisting alloy castings.



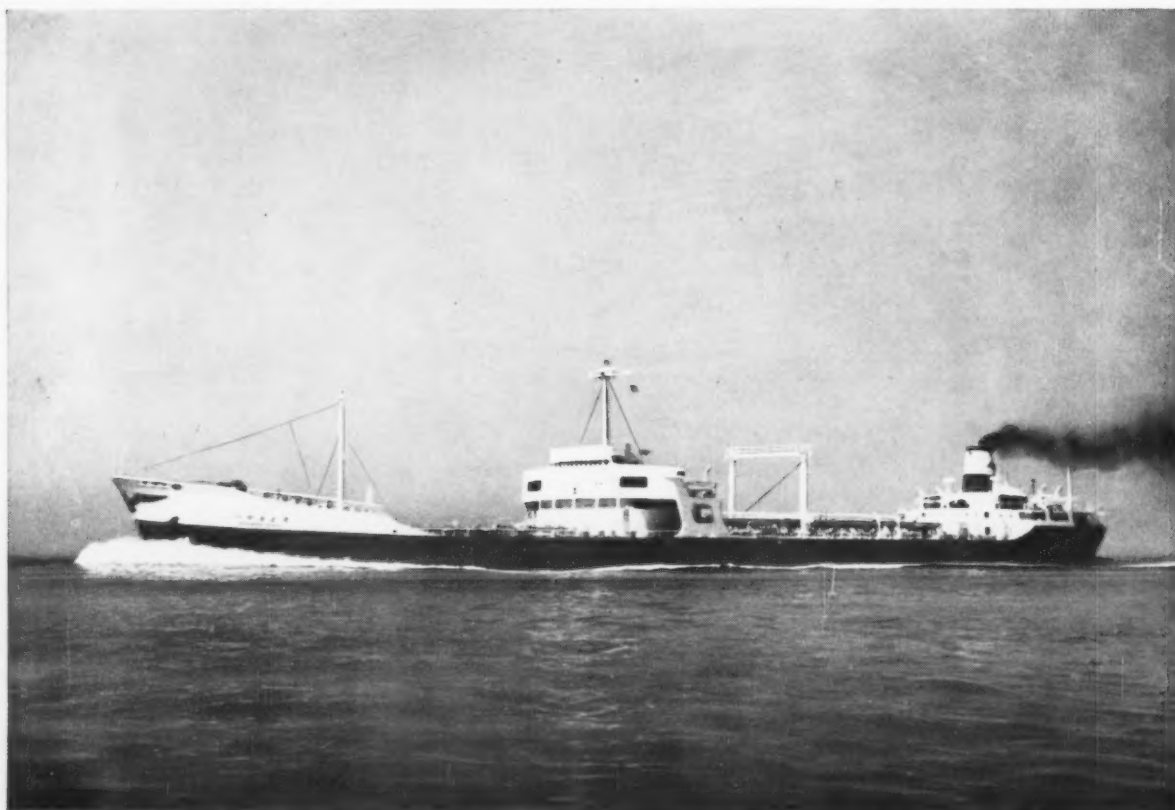
### BLAW-KNOX COMPANY

*Foundry and Mill Machinery Division*

*Blaw-Knox Building • 300 Sixth Avenue*

*Pittsburgh 22, Pennsylvania*

# NKK-STEEL, PIPES & SHIPS



**Tankers built by NKK with NKK's steel carry oil produced with NKK's pipes**

NIPPON KOKAN's capacity to produce from iron ore an astonishing variety of high-quality products assures customers that the most exacting requirements will be promptly and faithfully met.

## **Principal Products:**

**Tubular Goods—Bars & Shapes—Plates & Sheets—G. I. Sheets—Pig Iron  
Ferro-Alloys — Coal Chemicals — Fertilizers — Refractories — SHIPBUILD-  
ING — SHIP REPAIRS — INDUSTRIAL ENGINEERING**



# **NIPPON KOKAN k.k.**

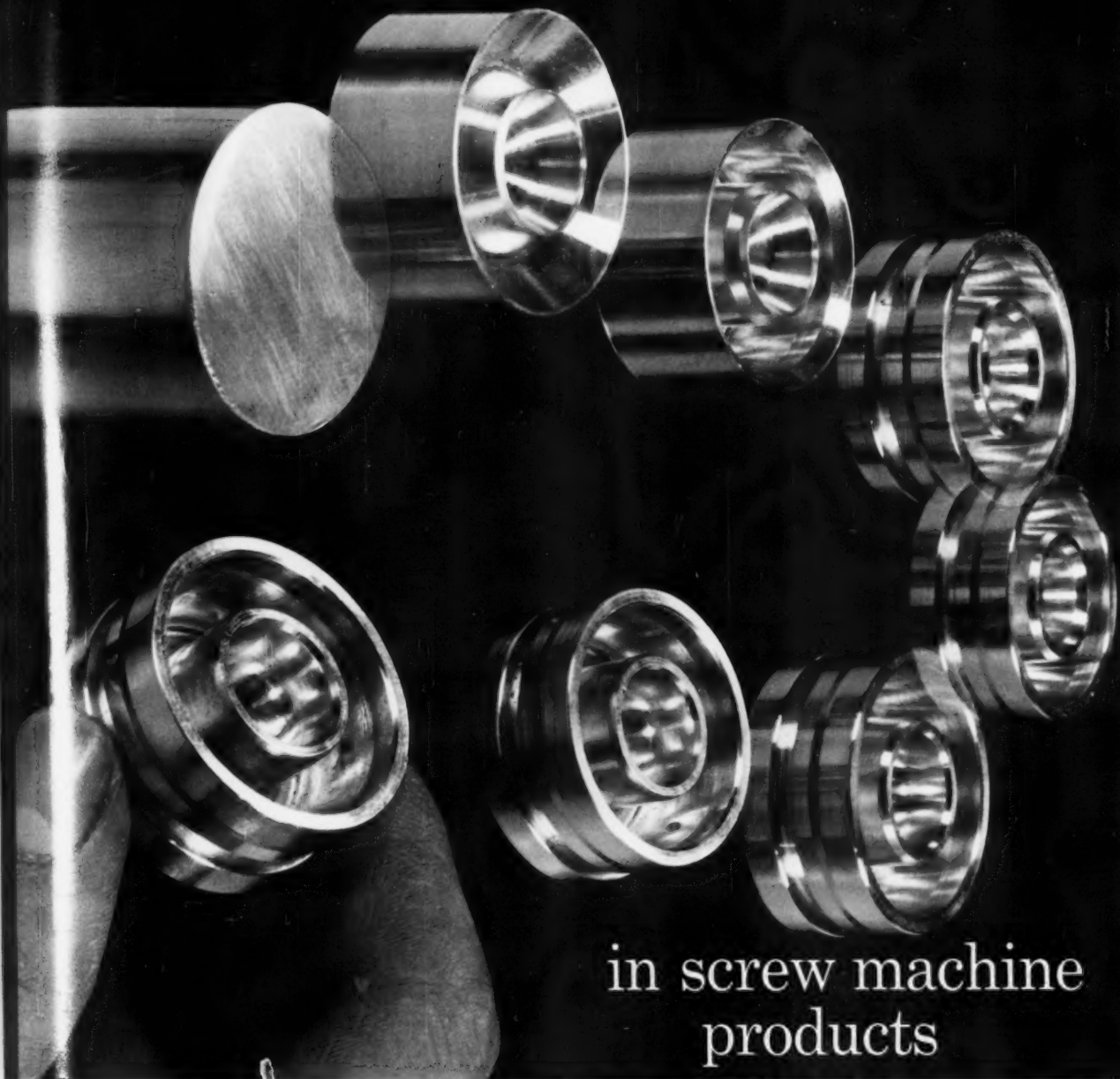
**(Japan Steel & Tube Corporation)**

**Head Office:** Ohtemachi, Chiyoda-ku, Tokyo

**Cables:** STEELTUBE TOKYO, KOKANSHIP TOKYO

**New York Office:** Room No. 1115, 39 Broadway, New York 6, N.Y., U.S.A.

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## in screw machine products

### Alcoa puts the metal where you want it

This aluminum piston for an automotive air-conditioning compressor shows how far Alcoa goes to put the metal where you want it. Not just in primary screw machine operations, complex and demanding as they were, but on through a series of exacting secondary operations that enabled us to deliver a completely finished part.

Using 1 $\frac{1}{16}$ -in. diameter 2014-T4 cold finished bar on a six-spindle automatic, we handled the forming, trepanning, drilling, facing and counterboring. Then we tackled the rest of the job—drilling and deburring two  $\frac{1}{16}$ -in. cross holes. This was followed by coining the ball seat at a specified tonnage in order to insure proper assembly without distortion. Centerless grinding was then performed to a total tolerance of half a thousandth of an inch (plus or minus 0.00025 in.). All finished? Not by our standards. After final inspection, we cleaned every piece and packed it with meticulous care to pre-

vent damage in transit, insuring safe and sound arrival.

Whether it's screw machine parts, forgings, castings, extrusions or impacts, Alcoa can put the metal where you want it—precisely and economically. The payoff may be fewer rejects, new flexibility in design, less waste in production, a best-selling product—or all four. To draw on Alcoa's file of ideas and Alcoa facilities, write today: Aluminum Company of America, 920-K Alcoa Building, Pittsburgh 19, Pa.

*Alcoa puts the metal where you want it—in castings, forgings, impacts, extrusions and screw machine parts.*

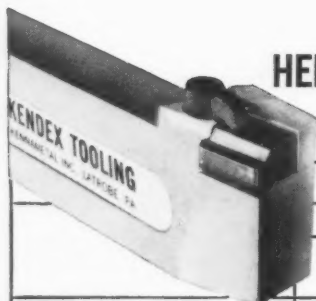


For exciting drama watch "Alcoa Presents" every Tuesday, ABC-TV, and the Emmy Award winning "Alcoa Theatre" alternate Mondays, NBC-TV

Your Guide to the Best in Aluminum Value



# DON'T WASTE DOLLARS IN MACHINE OUTPUT TO SAVE PENNIES IN TOOL LIFE



HERE'S HOW SOME SHOPS HAVE DOUBLED AND TRIPLED  
THE OUTPUT OF EXPENSIVE MACHINES

Typical Examples—Same Machines . . . Same Tools . . . Same Workpieces								
	Job No. 1		Job No. 2		Job No. 3		Job No. 4	
	240-Minute Tool Life Setup	25-Minute Tool Life Setup	75-Minute Tool Life Setup	25-Minute Tool Life Setup	120-Minute Tool Life Setup	80-Minute Tool Life Setup	120-Minute Tool Life Setup	22-Minute Tool Life Setup
Machine Cost per Hour	\$ 8.00	\$ 8.00	\$10.00	\$10.00	\$ 9.00	\$ 9.00	\$ 9.00	\$ 9.00
Tool Cost per Hour	\$ .04	\$ .40	\$ .36	\$ .76	\$ .14	\$ .215	\$ .14	\$ .77
Cost per 8-Hour Shift	\$64.32	\$67.20	\$82.88	\$86.08	\$73.12	\$73.72	\$73.12	\$78.16
Pieces per Shift	51	181	8	17	94 hrs./pc.	41 hrs./pc.	8	16
Cost per Piece	\$ 1.26	\$ .37	\$10.36	\$ 5.06	\$859.16	\$377.81	\$ 9.14	\$ 4.88
Cost Reduction	70%		51%		56%		47%	

Get the complete story . . . send for the booklet "There's Profit in Retiring a Tradition."

From many machine shops the story is the same—they are sacrificing low-cost carbide inserts through increased feeds and speeds . . . to achieve startling savings in total-cost-per-piece. Production increases even greater than 100% have been recorded. The increased tool costs were insignificant by comparison.

Where machines have been operating at less than maximum efficiency, unit cost can be reduced on many jobs overnight . . . merely by using modern cutting tools to get full potential machine output . . . instead of operating at fractional machine capacity to gain long tool life.

This idea has been **PROVEN-IN-USE** by many progressive plants. We will gladly send you records of such operations. These results can be duplicated in plants where machines and talented operators have been held back by old ideas about tooling and tooling costs. Ask your Kennametal Carbide Engineer how Kendex\* (patented) tooling can help you get more efficient output from your machines . . . or write KENNAMETAL INC., Latrobe, Pennsylvania, for the booklet "There's Profit in Retiring a Tradition."

\*Trademark

9-7229



INDUSTRY AND  
**KENNAMETAL**  
...Partners in Progress

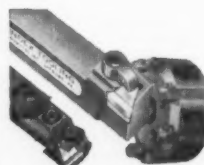
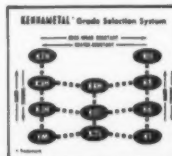
## TO MULTIPLY YOUR MACHINE OUTPUT ...YOU NEED 3 THINGS:



### The 'Three-Man Tooling Team'

that utilizes the specialized knowledge of your Tool Engineer, your Machine Operator, and the Kennametal Carbide Engineer . . . to get the right tooling on every job.

The Kennametal complete range of grades that provides the precise properties and uniformity that permits accurate prediction of tool life.



**Kendex Instant Insert** change without need to reposition the tool. This is the key to this new practice . . . frequent tool change without excessive down-time.

# 35%

**Faster with a  
CUT MASTER  
Model 75**

**BULLARD**

With their new 76" Bullard Cut Master, Model 75, the Bird Machine Company, South Walpole, Mass., is machining a 39-5/8" diameter stainless steel cylinder frame assembly 35% faster than previously, according to Mr. James Lindsay, General Superintendent.

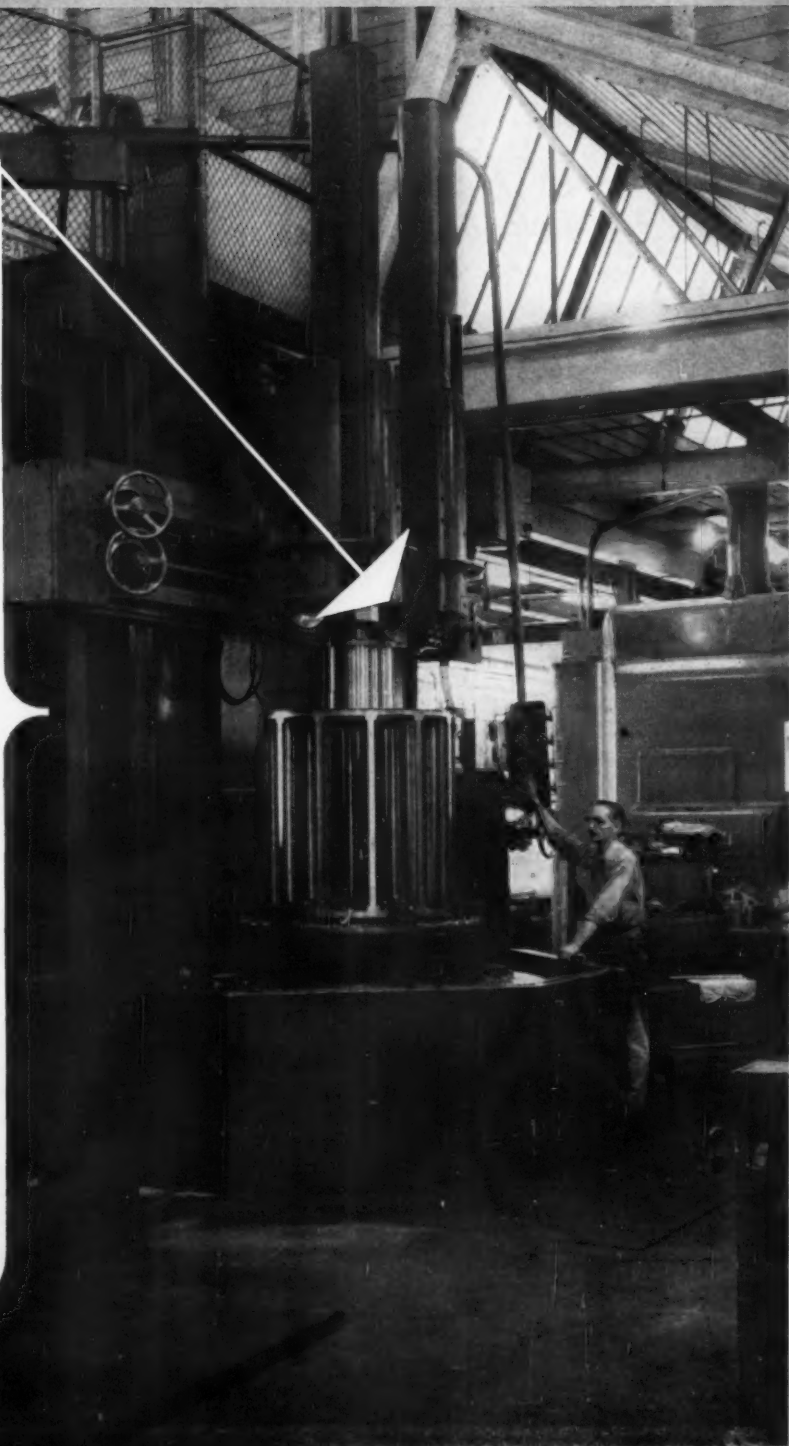
For the rough cut, removing from 1/8" to 3/16" of stock, the ram and side heads are cutting simultaneously. On the finish cut, .005" deep, only the side head is used.

Accuracy to hold size reduces spoilage. Pendant control reduces operator fatigue. These factors contribute to make these savings possible.

An analysis of your turning, boring, facing and threading operations may show a savings over your present method. Your Bullard Sales Engineer can tell you. Why not ask him?

Or, write

**THE  
BULLARD  
COMPANY**  
BRIDGEPORT 9,  
CONNECTICUT

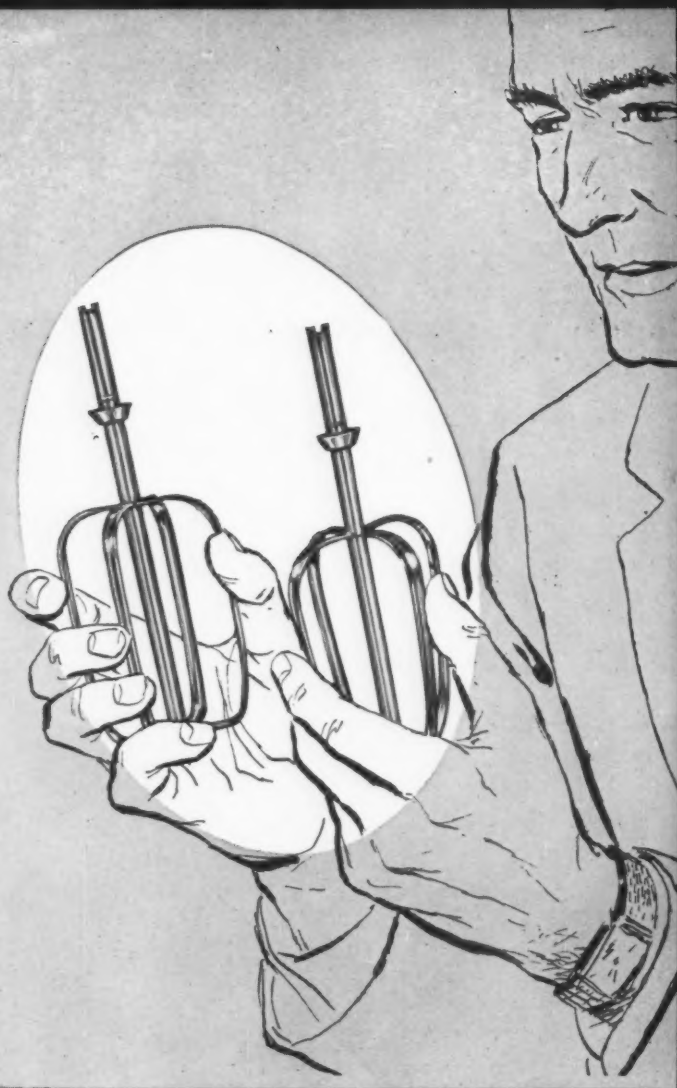


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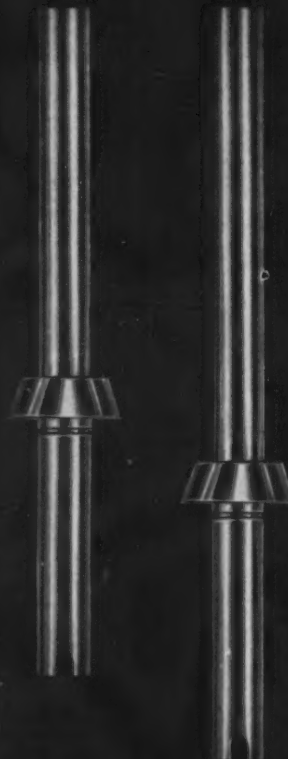
## Pre-plating Preparation Cut from One Hour to A Few Minutes With LUSTERIZED® Bars

For as long as many can remember, the trademark Mixmaster has been the symbol of a quality, dependable household mixer. The pioneer producer of this type of popular kitchen appliance, Sunbeam has always insisted on the best materials and meticulous workmanship.

No little attention is given to attaining the highest quality chrome plating on the beater shafts, for example. The chrome must be smooth, free of pits where food might accumulate, and remain bright over years of hard use. To accomplish this, burnishing the cold finished steel bars formerly used for one hour was necessary in order to bring the bars up to the pre-plating brightness and smoothness required.

This expensive, time-consuming operation has been reduced to only a few minutes since Bliss & Laughlin's Lusterized cold finished steel bars have been used. That's because dulling, gritty processing contaminants, oils and lime are removed at the mill by Bliss & Laughlin's exclusive, patented finishing process. The close tolerances characteristic of Bliss & Laughlin production enable Sunbeam to count on a consistently tight fit of the shafts at the beater bearings, which minimizes vibration.

Ask us to show you how your production can benefit from the tangible quality and cost-saving advantages of specifying "Bliss & Laughlin Lusterized Finish"—the big difference in cold finished steel bars. Standard prices apply!



*Sunbeam*  
MIXMASTER  
MIXER

Originators of LUSTERIZED® Finish—The BIG DIFFERENCE in Cold Drawn Steel Bars

# BLISS & LAUGHLIN

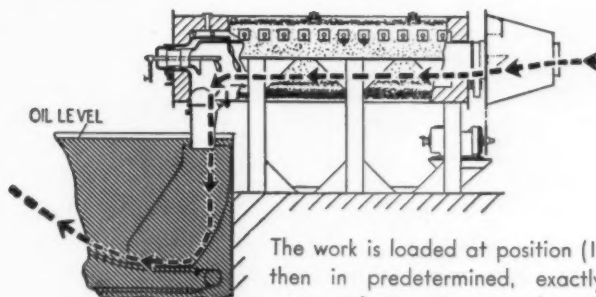
GENERAL OFFICES: Harvey, Ill. • PLANTS: Harvey, Detroit, Buffalo, Mansfield, Mass.

Largest Independent  
Producer of  
Cold Finished  
Steel Bars

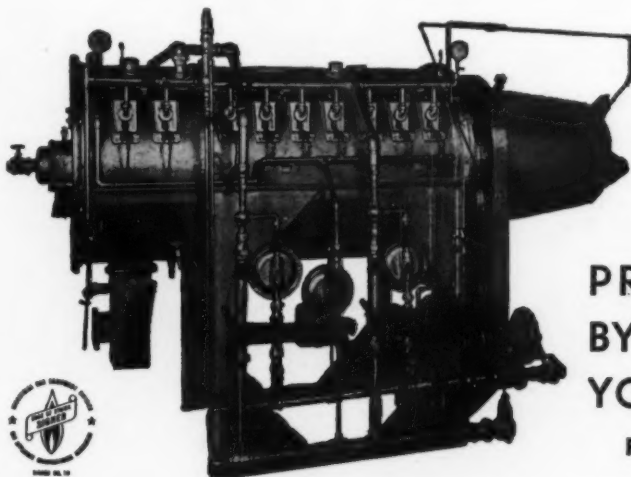
THE

IT IS NOW POSSIBLE TO PUT YOUR HEAT TREATING FURNACE IN  
YOUR PRODUCTION LINE BY INSTALLING

# AGF AUTOMATIC CONTINUOUS FURNACES



The work is loaded at position (1) then in predetermined, exactly measured amounts, moves through the furnace and into the quench tank (2) thence out by conveyor to heating, washing, tempering or any desired further treatment.



**AGF AUTOMATIC CONTINUOUS FURNACE**  
Model 136 utilizes a Rotary Retort and has a heat treating capacity of 150 to 400 pounds per hour. Larger models are available for higher production needs and single installations are now able to handle up to 1000 pounds of steel products per hour with a guarantee of uniform clean hardening.

A completely new combustion system and other engineering features permit processing ferrous or non-ferrous parts at temperatures from 600°F. to 1850°F. Clean hardening, ammonia-gas case hardening, light case carburizing of steel parts or the heat treating of aluminum parts can be accomplished with equal ease and without any modification of the furnace.

"PIONEER inventors, designers and builders of industrial heat treating and gas tempering equipment since 1878."

## PROOF IS PROVIDED BY MANY USERS, THAT YOU SHOULD CONSIDER

### PRODUCTION LINE HEAT TREATING

AGF Engineers and Metallurgists have kept up with the trend to continuous automatic production. As a result it is possible to point to several important installations that are successfully providing "round-the-clock" output of startling volume.

It costs nothing to present your heat treating production problem to a qualified AGF representative in your area.



### AMERICAN GAS FURNACE CO.

1004 LAFAYETTE ST., ELIZABETH 4, N. J.

Please send full descriptive material upon the AGF model 136 Automatic Furnace.

My Name is ..... Title .....

Company .....

Street ..... City .....

I want to heat treat ..... lbs. per hr. of .....

- ☐ I will send samples for your recommendation.
- ☐ Please have your representative call at no obligation to my company.



## WANTED: more "wife savers"

### UNILOY STAINLESS STEELS

Modern homemakers know that dishwasher detergents cannot mar the gleaming beauty of household items made of stainless steel. That's why sales are soaring in new and growing markets for these attractive, enduring, easy-to-keep-clean "wife savers."

For uniform high quality, lustrous finish and ease of fabrication . . . always specify Uniloy Stainless Steel.

**UNIVERSAL**  
 **CYCLOPS**  
 STEEL CORPORATION  
 BRIDGEVILLE, PA.

STAINLESS STEELS • TOOL STEELS • HIGH TEMPERATURE METALS

# Radiographs-

*dry and ready-to-read  
in 13 minutes*

## KODAK INDUSTRIAL X-OMAT PROCESSOR



Now it takes only 13 minutes to process your industrial radiographs. The Kodak X-Omat Processor produces radiographs of uniform high quality . . . and it brings automation to your darkroom.

Exposed films are merely removed from their holders and fed directly into the processor. Film hangers are eliminated. And only 22 inches of the unit's 10-foot, 10-inch length need extend into the darkroom itself.

Kodak Industrial X-ray Films, Type AA and Type M—sheet films or continuous lengths—go through the system at the rate of 38 inches per minute.

This means time saved and costs cut. You should have the complete story. Send for the folder that gives all the details.

**X-ray Division — EASTMAN KODAK COMPANY — Rochester 4, N.Y.**

EASTMAN KODAK COMPANY, X-ray Division, Rochester 4, N. Y.

22-11

☐

Send the folder about the Kodak Industrial X-Omat Processor.

☐

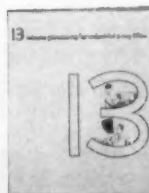
Send the names of the Kodak Industrial X-Omat Processor dealers in my area.

Name \_\_\_\_\_

Firm Name \_\_\_\_\_

Firm Address (Street) \_\_\_\_\_

(City) \_\_\_\_\_ (Zone) \_\_\_\_\_ (State) \_\_\_\_\_

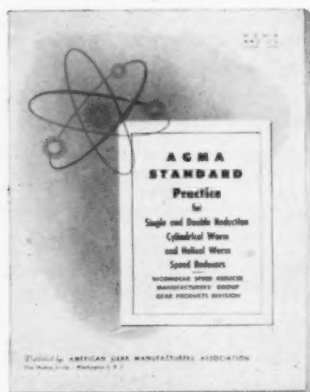


*Mail this  
coupon for  
full  
information*

**Kodak**

# DE LAVAL offers new A.G.M.A. Gear Standards Booklet for Engineers

You will not want to be without this newly published American Gear Manufacturers Association booklet. It outlines the new standards for single and double reduction cylindrical worm and helical worm speed reducers.



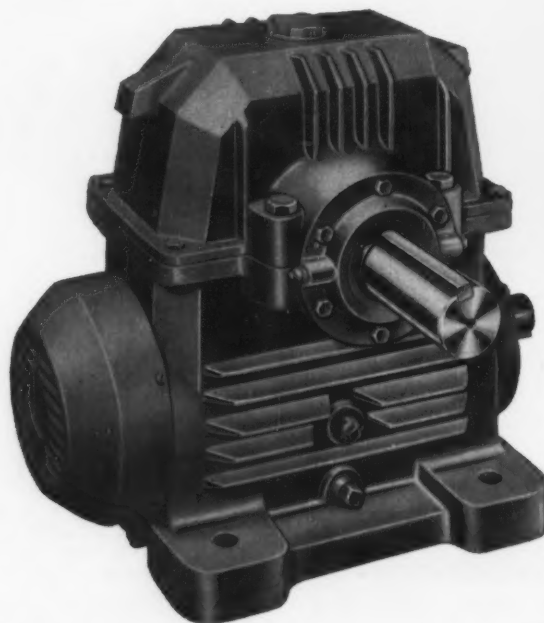
Get this new A.G.M.A. 440.03 booklet  
free of charge by request  
on your company letterhead.

This new standards booklet contains important design data including: Power rating of worm gears • Ratio correction factor ( $K_m$ ) • Materials factors ( $K_s$ ) • Velocity factor ( $K_v$ ) • Coefficient of friction ( $\mu$ ) • Thermal factor • Service factors • Efficiency • Overhung load capacity • Lubrication.

The materials factor ( $K_s$ ) and the coefficient of friction ( $\mu$ ) are new, reflecting the latest advances made in worm gearing in the past few years.

We have also recently published our new Delroyd Worm Gear Sets Catalog 3800 and Delroyd Single Reduction Worm Gear Catalog 3805, which contain comprehensive information on the selection of these units.

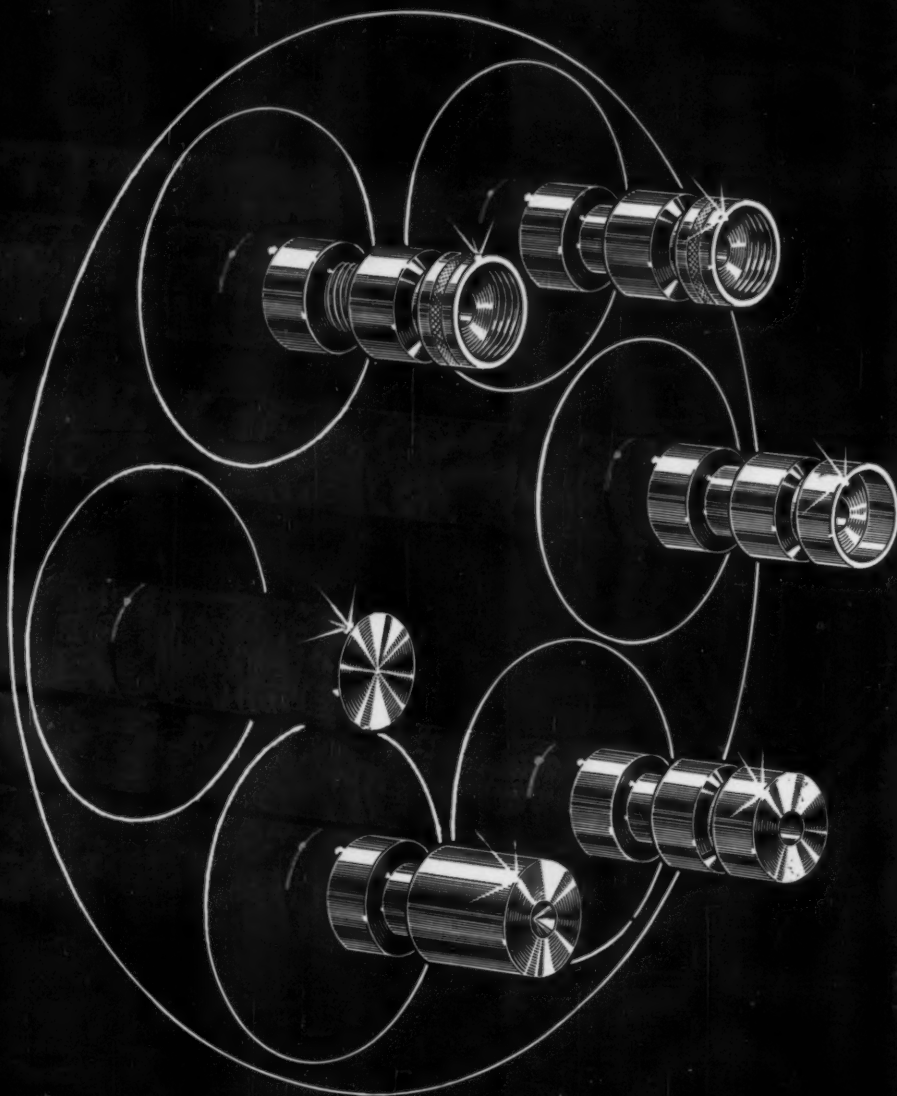
De Laval furnishes worm gearing under the trade name DELROYD and has a complete line from  $1\frac{1}{8}$ " to 36" center distance, in horsepower ranges from .04 to 700 and in ratios from 5: to 4900:.



**DE LAVAL**

**Steam Turbine Company**

899 NOTTINGHAM WAY, TRENTON 2, NEW JERSEY



## **3½" - More capacity than ever in a New Britain**

### **Model 82 • Six Spindles • 3½" Capacity • All New**

Here is a *brand new* New Britain . . . the most modern large capacity bar machine available. The Model 82 brings to the 3½" size range all the versatility and exclusive New Britain features previously available only on smaller models. Designed from the ground up for large capacity work, the Model 82 is the only 6-spindle machine on the market that offers a really up-to-date replacement for the older, slower methods currently used for this size range.

Each of the six spindles on the Model 82 has an independent, cam-operated cross slide. These cross slides combined with the end-working tool slide allow practically unlimited tooling combinations.

The Model 82, like all New Britain Bar Machines, has a special lifting and locating mechanism which prevents wear on the spindle carrier. Rigid locking of the carrier to the massive frame during the cutting cycle eliminates vibration.

The power, massiveness, speed range, accuracy, ease of changeover, coolant capacity and every other feature de-

signed into the Model 82 makes this the right machine for high-precision, high-production, large-capacity bar work.

Why not investigate the possibilities the Model 82 offers in your plant? When you get right down to it, it's the first chance you've had in a long time to update production in an area that needs it badly. Complete catalog material is available on the whole range of New Britain Six Spindle Bar Machines. For your copy, write to The New Britain Machine Company, New Britain-Gridley Machine Division, New Britain, Conn.

# 27 CHASE SERVICE CENTERS OFFER STAINLESS STOCKS

Immediate delivery from a growing new reservoir. Millions of pounds of sheet, plate, bar, wire, tube, pipe.

CHASE®, long the nation's largest chain of warehouses handling corrosion resistant metals, has expanded its services to include white metals—STAINLESS and ALUMINUM.

At this critical time Chase personnel throughout the nation want to help you fill your shortages and plan to serve you regularly.

CALL OR TRY YOUR NEAREST CHASE WAREHOUSE TODAY

Ask for our national  
stock sheet to be  
mailed to you regularly



## Chase

BRASS & COPPER CO. WATERBURY 20, CONN.  
Subsidiary of **Kennecott Copper Corporation**

THE NATION'S HEADQUARTERS FOR ALUMINUM • BRASS • BRONZE • COPPER • STAINLESS STEEL AND FORGINGS  
Atlanta Baltimore Boston Charlotte Chicago Cincinnati Cleveland Dallas Denver Detroit Grand Rapids Houston Indianapolis Kansas City, Mo. Los Angeles  
Milwaukee Minneapolis New Orleans New York-Newark Philadelphia Pittsburgh Providence Rochester St. Louis San Francisco Seattle Waterbury

# 3M Announces... **NEW** ...the miracle production cleaning material... **SCOTCH-BRITE®**

**Cleans better, cleans faster, costs less!**



***We'll prove it  
on your toughest cleaning jobs!***

What do you have to clean?—raw stock, product parts, production equipment? We've tested and proved "SCOTCH-BRITE" Brand Cleaning Material for them all—for example, conveyors, tanks, bins, and vats, on flat metal, tubing, glass molds, printing plates, printed circuits, on metal/plastic combinations and many others.

You've never seen anything like new "SCOTCH-BRITE" material: a tough, springy, web-like pad of nylon filament with small working particles of abrasive mineral. Lightweight, long-wearing, easy to bend, fold or cut to shape. Let us show you how easily "SCOTCH-BRITE" loadings can replace your present power brushes, on almost any fixed or portable hand or automatic cleaning equipment!

**MINNESOTA  
MINING AND  
MANUFACTURING COMPANY**



...WHERE RESEARCH IS THE KEY TO TOMORROW

The term "SCOTCH-BRITE" is a registered trademark of 3M Co., St. Paul 6, Minn. Export: 88 Park Ave., New York 16, Canada: London, Ontario

***We'll prove it  
with your present equipment!***

See for yourself how "SCOTCH-BRITE" Brand Cleaning Material outcleans and outlasts wire brushes, fiber brushes, steel or other wools—and at lower initial cost, too! It wipes away dirt, grease, wax, stains, scale or oxides; follows complex contours that bristles can't reach—and rinses clean without rusting or staining!

***We'll prove it—at no obligation to you!***

3M Co., 900 Bush Ave.,  
St. Paul 6, Minn., Dept. AAT-119

Please call to arrange a free demonstration of "SCOTCH-BRITE" material on our cleaning operations.

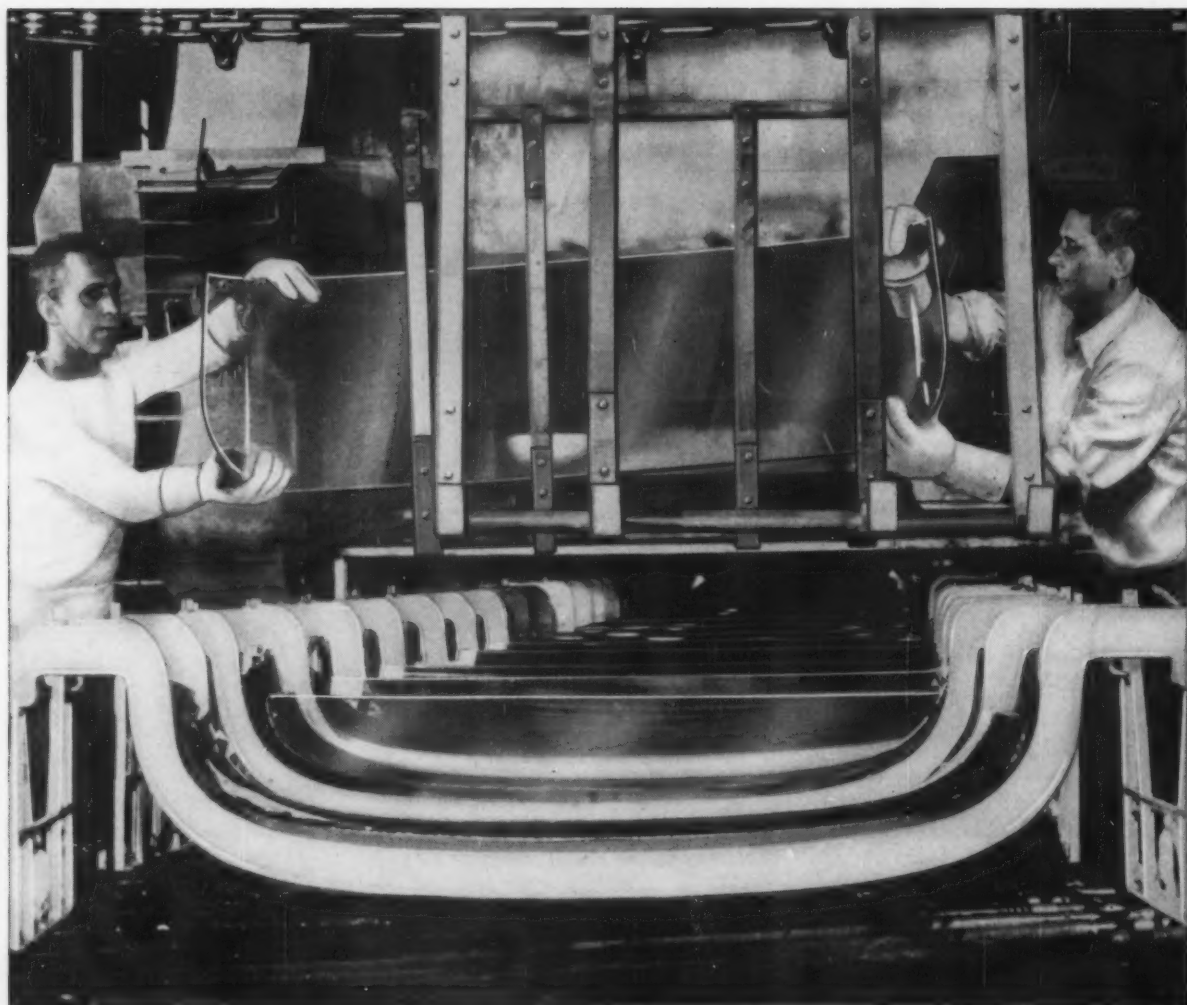
NAME \_\_\_\_\_

POSITION \_\_\_\_\_

COMPANY \_\_\_\_\_

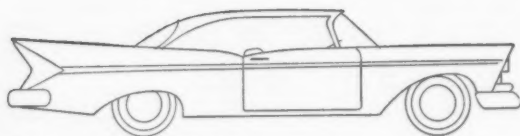
ADDRESS \_\_\_\_\_

CITY \_\_\_\_\_ ZONE \_\_\_\_\_ STATE \_\_\_\_\_



## Greater visibility, trimmer lines in new car styling...

## thanks to GAS



With nearly 7,000,000 cars being produced annually, the increased use of glass has demanded major production improvements in the manufacture of new panoramic windshields and back-lights.

Since the forming of the intricately curved glass is done at a temperature at which glass is soft and can be bent, the production process challenged heat process engineers to design new automatic equipment capable of mass producing these large precision glass pieces.

Selas engineers, working with the nation's leading glass manufacturer, discovered that Gas could produce the proper time-temperature cycle demanded by this

process, efficiently, quickly, reliably. The flat glass is conveyed under radiant Gas burners which bring the glass quickly up to bending temperature and allow the shaping of windshields, with reproducible uniformity, at high production rates.

The production of this wrap-around windshield is another example of the contributions modern Gas equipment is making to American manufacturing. If you have an operation demanding precise process heating, call your local Gas Company's Industrial Specialist and discuss the economies and results you, too, can get with modern Gas equipment. *American Gas Association.*

See Playhouse 90 with Julia Meade on CBS-TV. Watch local listings for time and station. Sponsored by your Gas Company and the Gas Industry.

SEND THIS COUPON TODAY

The American Brass Co., Fabricated Metal Goods Div.  
Waterbury 20-A, Connecticut

Please send me a copy of Publication BG-5

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Company.....

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City..... Zone..... State.....

**ANACONDA**

**Fabricated Metal Products**



COPPER

BRASS

BRONZE

NICKEL SILVER

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STEEL

STAINLESS STEEL

ALUMINUM

THE AMERICAN BRASS COMPANY · FABRICATED METAL GOODS DIVISION, WATERBURY 20, CONN.

## COST-CUTTING IDEAS THAT PAID OFF

All the parts shown on the cover of the booklet were designed to serve a specific function—at a lower cost. Some of them are made from customer-owned tools, specially designed to make a better part at a saving in material cost and fabricating time. They illustrate only a few of the thousands of multiple-plunger and progressive-tool press products we supply to every branch of industry—from simple eyelets to precision electronic components.

We offer a complete design-engineering service based on long experience and specialized production equipment, and often are able to suggest ways and means of using

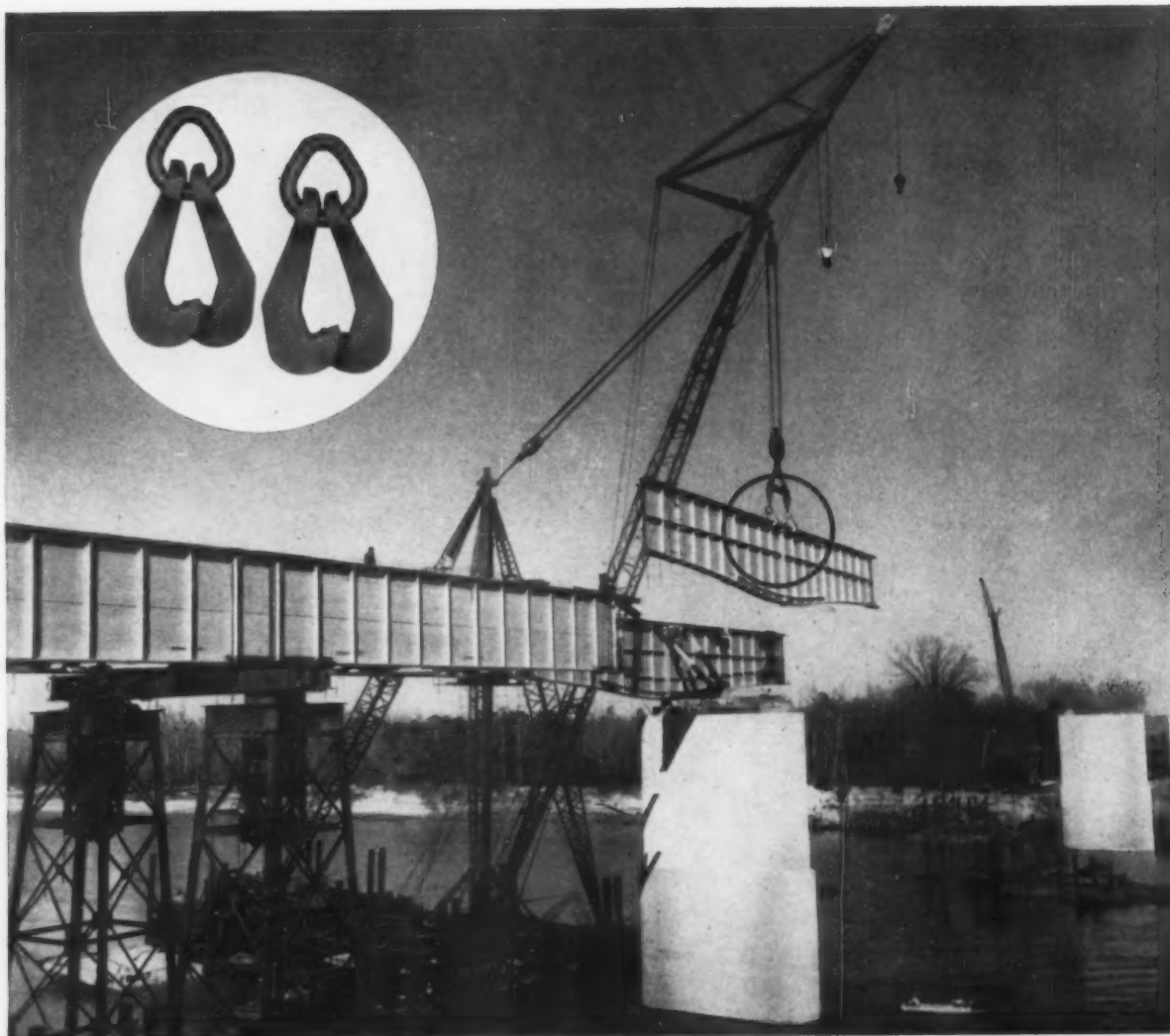
some of our many stock tools to cut your costs still further.

Perhaps we can develop cost-cutting ideas for you, too. The booklet describes and illustrates the range and types of parts we fabricate. A sample, drawing or description of a part you need to produce at a low cost will give our designers a chance to work on your cost problems—at no obligation to you.

00068

**ANACONDA®**

**MULTIPLE-PLUNGER PRESS PRODUCTS**



**BIG LIFT.** Traveler derrick of John F. Beasley Construction Co., Dallas, Texas, erecting 125-ton girder assembly on Red River Bridge in Louisiana.

The Missouri Steel Castings Company, Joplin, Mo., chose a nickel alloy cast steel for the girder dogs (circles) which take the brunt of the giant load.

## 2% nickel cast steel girder dogs say "Upsy Daisy" to 125-ton loads

A girder assembly that weighs 125 tons is more than most dogs can handle.

But here is a case where they get the needed extra strength — with a nickel-chromium-molybdenum alloy cast steel, normalized and tempered to meet ASTM Specification A-148-55T, Grade 105-85.


Containing 2% Nickel, this alloy cast steel has nominal properties on the order of 114,000 psi tensile strength, 89,000 psi yield strength and 21% elongation.

It's easy to see why nickel alloy cast steels have long and successful records on jobs where service conditions call for properties superior to those of carbon steel...

Among other advantages, nickel alloyed cast steels save weight without sacrifice of strength... provide hardness and wear resistance without brittleness... show excellent resistance to fatigue, and resistance to the effects of high or low temperatures. What's more, their character-

istics of good fluidity and reliable response to heat treatment keep them popular with the foundryman.

**Want the full story?** Our illustrated 34-page booklet, "Nickel Alloy Steel Castings in Industry," covers practically everything you'll want to know about these versatile products. A copy is yours for the asking. Write for it today.

**THE INTERNATIONAL NICKEL COMPANY, INC.**  
67 Wall Street  New York 5, N.Y.

# INCO NICKEL

**NICKEL MAKES ALLOYS PERFORM BETTER LONGER**

# ALL-NEW ALEMITE "77" LUBRICANT PUMP packs most power

FOR HIGHEST PERFORMANCE!

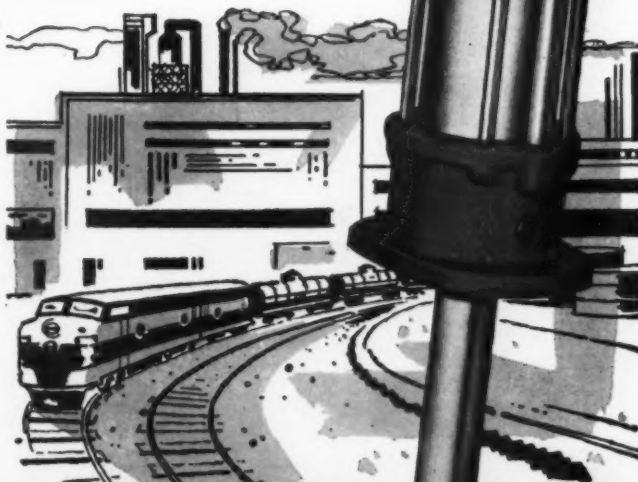
**68% More Powerful . . .** outperforms any other air-operated lubricant pump of its class on the market today! The all-new 5.2 horsepower Alemite "77" Pump assures smoothest, fastest delivery of all lubricants, through longest lines!

**Three Master Pressure Ratios** for unequalled delivery of all lubricants — fluid, semi-solid and heavy fibrous types. Lightweight, rust-proof aluminum construction.

**Precision Engineered** from finest quality materials—designed for outstanding ease of operation and maximum performance. Models for 120-lb. or 400-lb. drums — for all industrial applications.

## All-New Alemite "77" Features!

- **Volume Air Distributing Valve**—self-seating, self-cleaning, volume porting
- **Modern-Design, Highly Efficient Toggle Trip Mechanism** provides balanced pressure on shuttle . . . won't bind
- **Straight-Line Exhaust** has extra-large port for highest pump efficiency
- **Hardened Steel Piston and Cylinder**, lapped to a precision fit of 125 millionths of an inch
- **All-Steel Primer Valve**, ground to a perfect seal . . . hardened for abrasion resistance
- **Dynamic Primer** assures priming and pumping of heaviest lubricants.



## THREE POWERFUL "77" MODELS

- **High-pressure (40 to 1 ratio)** for light-bodied and fibrous greases. Delivery on both up and down stroke.

- **Medium-pressure (25 to 1 ratio)** for heavyweight oils and light-bodied greases. Delivery on both up and down strokes.

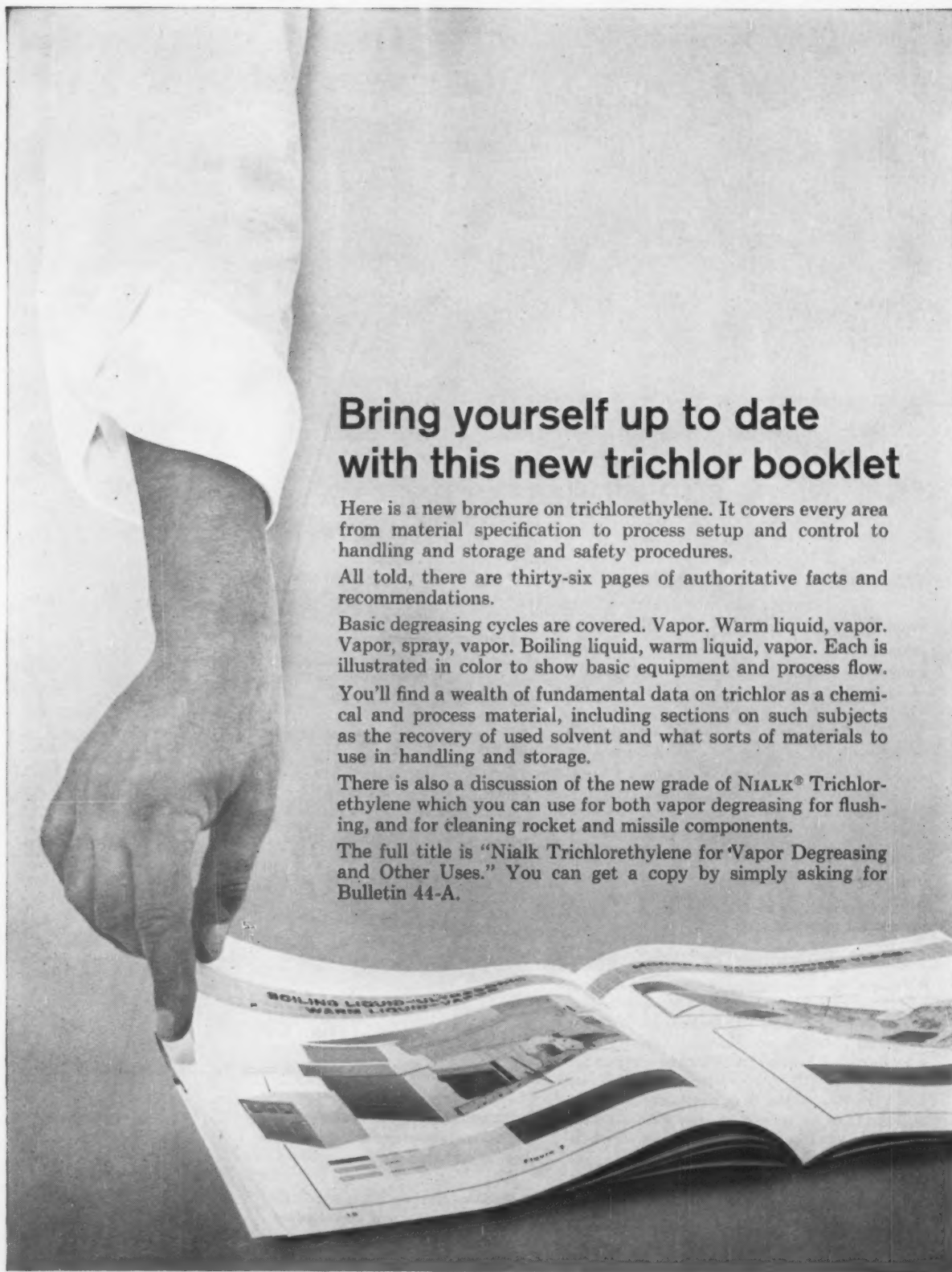
- **Volume delivery (6 to 1 ratio)** for light-bodied fluid lubricants. Single-acting pump mechanism.



Write for New Alemite  
"77" Pump Catalog!



Dept. G-112, 1850 Diversey Parkway, Chicago 14, Illinois



## Bring yourself up to date with this new trichlor booklet

Here is a new brochure on trichlorethylene. It covers every area from material specification to process setup and control to handling and storage and safety procedures.

All told, there are thirty-six pages of authoritative facts and recommendations.

Basic degreasing cycles are covered. Vapor. Warm liquid, vapor. Vapor, spray, vapor. Boiling liquid, warm liquid, vapor. Each is illustrated in color to show basic equipment and process flow.

You'll find a wealth of fundamental data on trichlor as a chemical and process material, including sections on such subjects as the recovery of used solvent and what sorts of materials to use in handling and storage.

There is also a discussion of the new grade of NIALK® Trichlorethylene which you can use for both vapor degreasing for flushing, and for cleaning rocket and missile components.

The full title is "Nialk Trichlorethylene for Vapor Degreasing and Other Uses." You can get a copy by simply asking for Bulletin 44-A.

### HOOKER CHEMICAL CORPORATION

311 Union Street, Niagara Falls, New York  
Sales Offices: Buffalo Chicago Detroit Los Angeles New York  
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FROM GENERAL ELECTRIC . . .

## NEW *Polyseal*\* Insulation Systems

- Sealed Against Contaminants
- Help Cut Motor Costs

MOTOR SAVINGS OF UP TO 50% are now possible by applying General Electric motors with Polyseal insulation systems in many outdoor, high moisture, dust and other severe atmospheres which formerly required additional enclosure protection.

POLYSEAL INSULATED COILS are vulcanized and cured—to bond and seal the supported silicone rubber tapes. Every coil must pass an underwater hi-pot test to make sure it is positively sealed against moisture and other contaminants.

THIS NEW GENERAL ELECTRIC INSULATION system also provides greater thermal, voltage and environmental endurance than conventional systems. For added mechanical strength, glass fabric supporting materials are imbedded in each layer of tape. Each coil is wrapped with many layers of this tape. Coils are securely held in the motor by G.E. patented tying and bracing techniques.

ALSO AVAILABLE IN G-E RANDOM-WOUND MOTORS, the Polyseal system is used for stator and end turns, sealing windings with a waterproof, inert covering.

FOR MORE INFORMATION on Polyseal Insulation Systems, call your nearby G-E Apparatus Sales Office, or write for bulletin GEA-6889, Section 884-4, General Electric Co., Schenectady, N. Y.

PROJECT '8000' . . . a major General Electric program of research, redesign, advanced manufacturing and improved customer service on A-c motors 150 to 6000-hp.

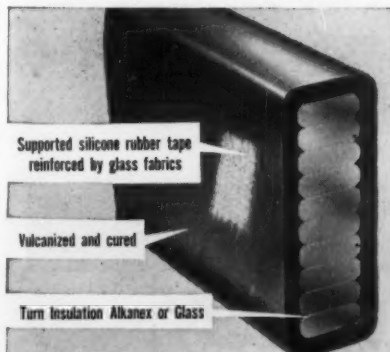
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GENERAL  ELECTRIC



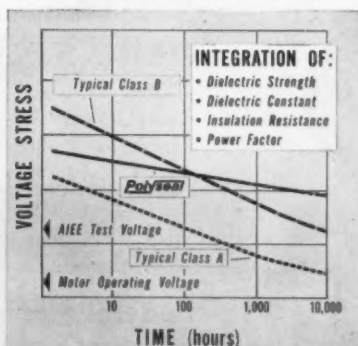
another G-E  
PROJECT  
'8000'  
development

### FULLY SUPPORTED



Using specially developed G.E. supported silicone rubber tape, Polyseal is the first silicone rubber insulation system on the market that is fully supported against mechanical breakdown.

### LONG LIFE



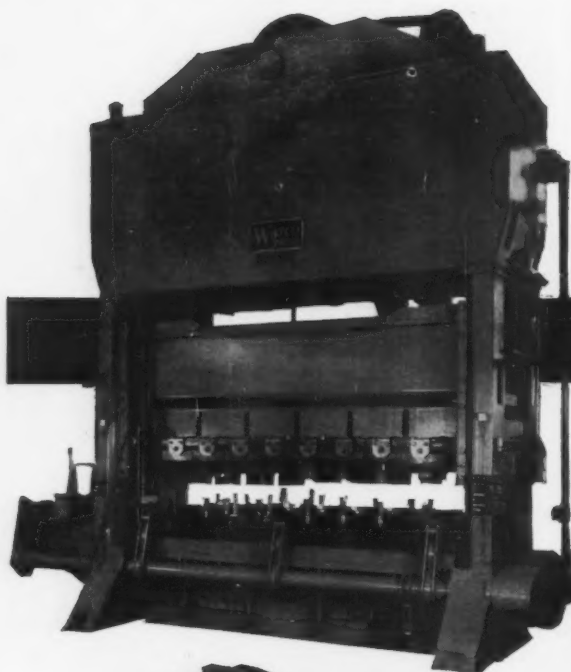
Tested over long periods of time with voltage applied, General Electric's new Polyseal silicone rubber insulation systems retain a much higher dielectric strength than other commonly-used insulations.

### COMPLETELY SEALED

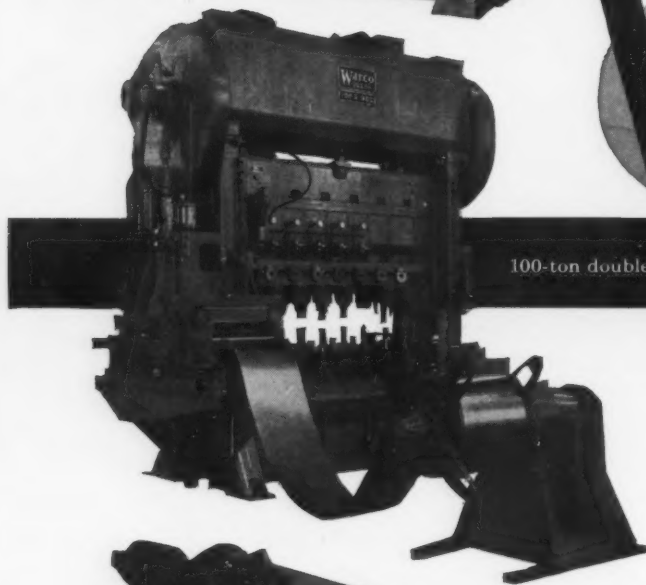


- Moisture resistant
- Carbon black resistant
- Contaminant resistant

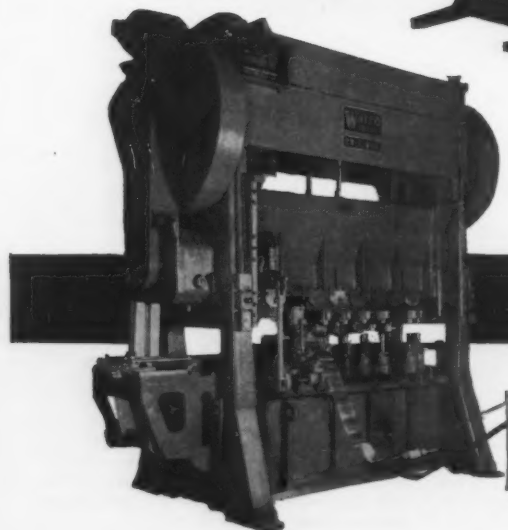
Positive lead seal is provided by special silicone rubber compound which vulcanizes the lead tubing to the silicone rubber wall of the coil. This effectively seals the coil against contaminants.



350-ton eccentric gear for automotive headlight housing.



100-ton double crank with outside blanking slide.



75-ton double crank for refrigeration parts.

The Federal Machine  
and Welder Company  
Warren • Ohio

**Federal**  
WELDERS<sup>®</sup>

**Warco**  
PRESSES<sup>®</sup>

## TRANSFER FEED PRESSES

To be absolutely sure you get modern . . .  
efficient . . . productive and profitable  
mechanical press operation . . . check with  
Warco engineers before you buy.



**THE ONES THAT WILL LAST (and last, and last!)?  
THOSE MADE FROM CONTINUOUS PROCESS  
ZINC-COATED STEEL SHEETS**

***And just why will they last and last?***

The people of the Galvanized Container Industry, always alert to make improvements to keep their products the best, can give you a multitude of reasons why. Chief among them: the continuous process insures a uniformly applied, corrosion-resistant zinc-coating. In fact, the zinc and steel are integrated to form a tight bond for every square inch, a durable coating which stands up to any rigorous stress of the fabrication process.

Continuous process zinc-coating will not chip or flake, no matter how much it is twisted, crimped or lock seamed. It can be worked to the very limits of the steel itself! Your budget benefits because there is no need for additional coating of any kind.

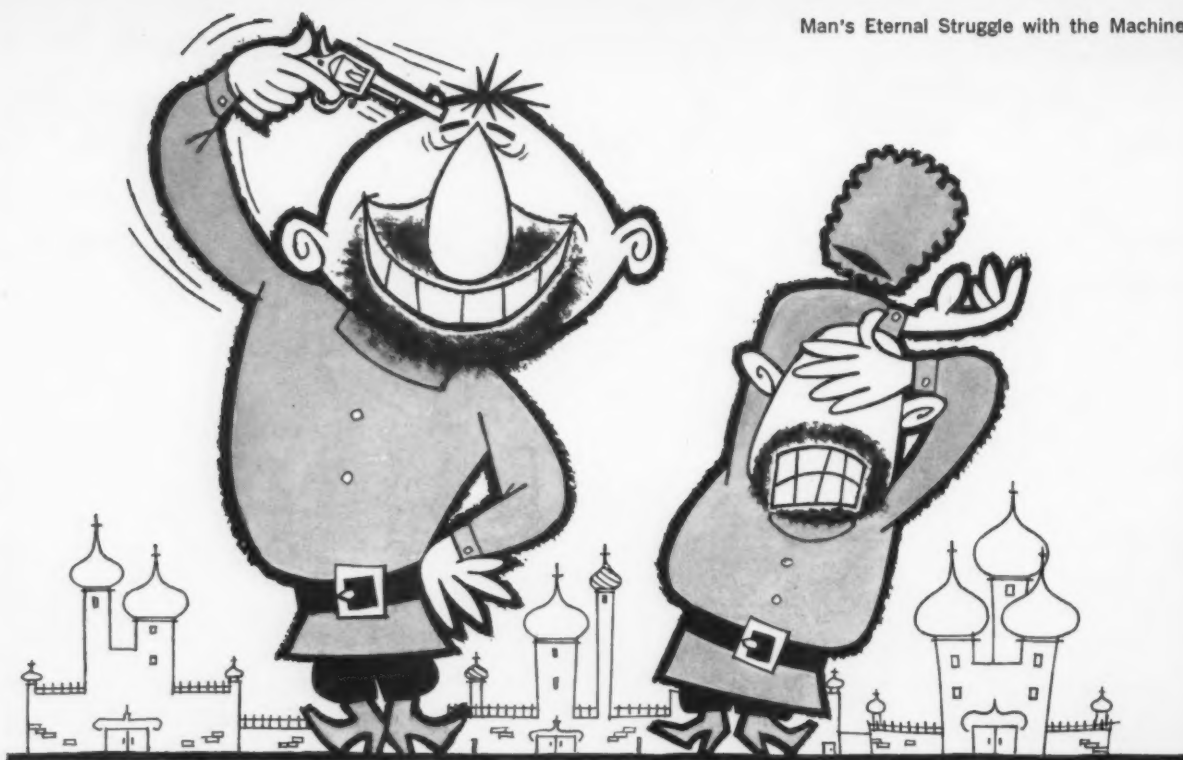
In continuous process zinc-coated steel, there is a stand-out—Weirkote. On your production lines and in your products, Weirkote will work for you all of the time. For detailed information on the many advantages of Weirkote zinc-coated steel, write today for a brochure. Weirton Steel Company, Dept. A-19, Weirton, West Virginia.



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COMPANY**

WEIRTON, WEST VIRGINIA  
a division of

**NATIONAL STEEL CORPORATION**



## Will you gamble machine performance to save on engineering development?

Watch out! The trigger you've got *your* finger on could loose destruction on production schedules. Probably blow the top off your own success as well.

Obviously, special equipment takes time to conceive and design, as well as build. And, the special machine builder is in business for profit the same as your company. Therefore, his prices must include engineering development—*unless you prefer to spend that time and money in machine try-out*. In that case, don't let anybody show you how much it really cost!

Sciaky has always emphasized engineering development. That's the only way equipment can be built to do the job it was sold to do. That's why Sciaky equipment has been specified for so many demanding applications. And that's why Sciaky equipment can be installed and put into production so quickly.

Why take less than the full advantage of consulting with Sciaky Engineers on your next equipment project.

No obligation, of course.

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## FEDERATED METALS DIVISION OF



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AT THE CHASE BRASS & COPPER CO.



## The STANLEY STEEL STRAPPING SYSTEM provides exceptional packaging flexibility

A wide range of product and package types, sizes, shapes and weights makes *packaging flexibility* mandatory. Chase Brass & Copper Co. achieves this *packaging flexibility* by using both manual and automatic STANLEY STEEL STRAPPING TOOLS and MACHINES to perform a variety of packaging jobs from bundling tubing, rod and pipe to securing coils of strip to pallets. An indication of the time and money saved is

this customer's report on the Stanley Power Electric Strapping Machine used to package up to 200 bundles of copper pipe per day . . . "has increased output up to 20% and reduced man-hours by almost 50%."

Write for Data Sheets to STANLEY STEEL STRAPPING, Division of The Stanley Works, Dept. K, 1317 Corbin Avenue, New Britain, Conn.

STANLEY

INSURE IT—SECURE IT WITH STANLEY STEEL STRAPPING

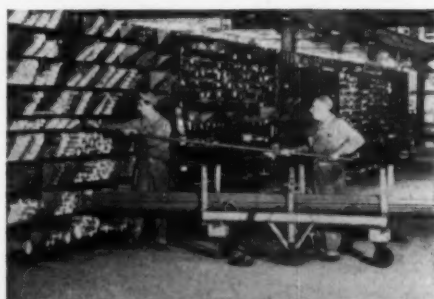
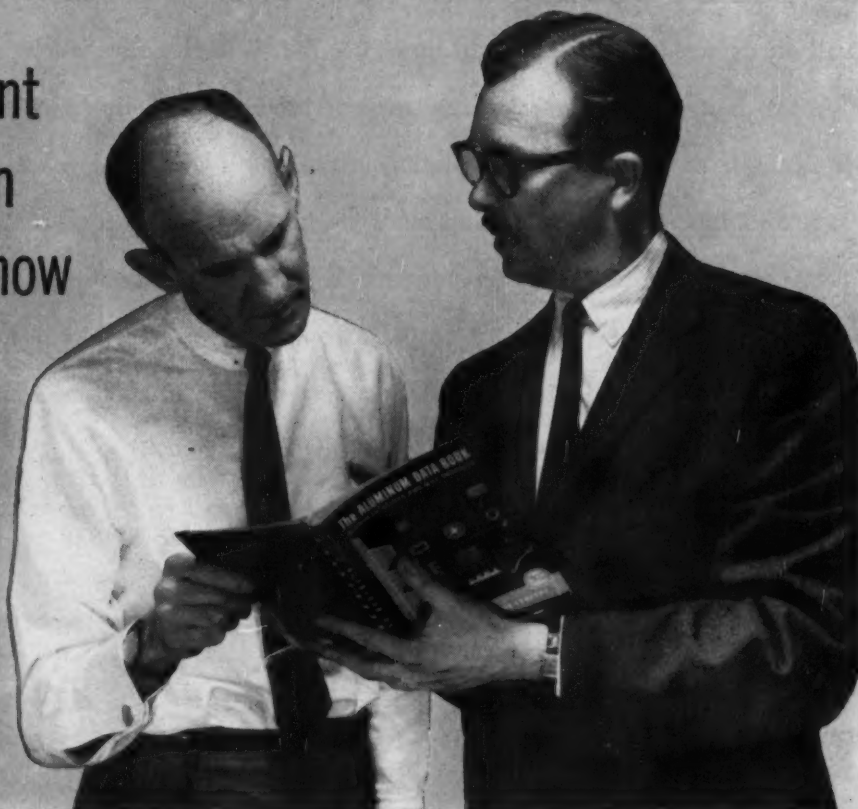
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AMERICA BUILDS BETTER AND LIVES BETTER WITH STANLEY

This famous trademark distinguishes over 20,000 quality products of The Stanley Works, New Britain, Conn.—hand tools • electric tools • builders hardware • industrial hardware • drapery hardware • automatic door controls • aluminum windows • stampings • springs • coatings • strip steel • steel strapping—made in 24 plants in the United States, Canada, England and Germany. In Canada: Steel Strapping Division, The Stanley Works of Canada, Ltd., Hamilton, Ontario

"When I want  
aluminum  
and know-how  
...I call the  
Reynolds  
Distributor."



Maybe you're not sure what's the best aluminum alloy for your product . . . or what machining speed to use . . . or the best way to weld aluminum. The answers to these problems, or to any question you might have concerning aluminum, is as close as your phone.

Just call the Reynolds Aluminum Distributor.

His men are *trained* specialists—yes, *experts*—in the use of aluminum. Chances are, they can show you plenty of cost-shrinking shortcuts, and help you use aluminum to its best advantage.

And, whether you need his technical services or not, you can be sure of the fastest delivery of aluminum—in the shape, size, form and alloy you need—from your Reynolds Distributor.

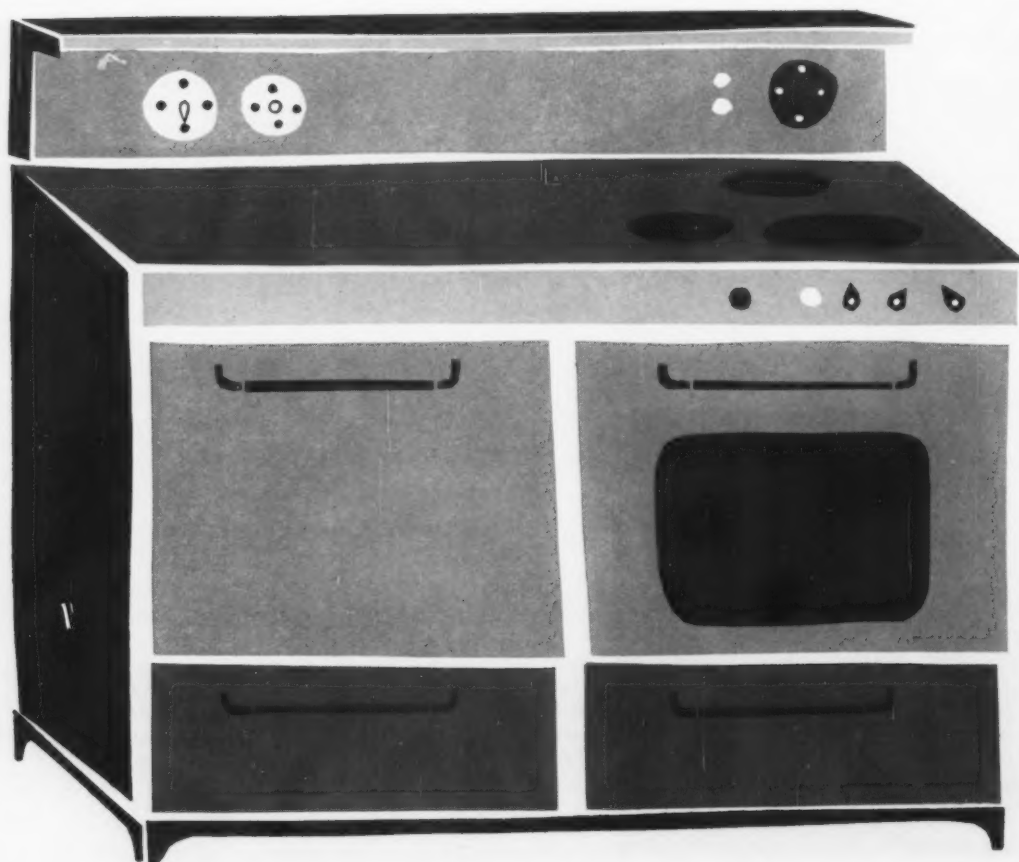
Watch Reynolds TV shows

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FOR FAST DELIVERY ON ALUMINUM,  
CALL THE REYNOLDS DISTRIBUTOR

Check the yellow pages of your telephone directory, under "Aluminum"

IF YOU'RE COOKING UP NEW WAYS TO SELL YOUR APPLIANCES, call on Brown-Lipe-Chapin right now! Let B-L-C engineers work with you at the design stage. We can help you add new sparkle to your product and help spark sales with Dura-Plate—the first major advance in chrome plating in the past twenty-five years. Also, under the same roof at Brown-Lipe-Chapin, you'll find mass-production facilities for quality, precision die casting and metal stamping. And for the finishing touch, there're facilities to anodize, polish and buff, electroplate and precision-paint any parts. Two plants, strategically located at Syracuse, New York and Elyria, Ohio, are ready to serve you with the same under-one-roof facilities. For further information, call or write Brown-Lipe-Chapin, Syracuse, New York.



**RELIABILITY** by **BROWN · LIPE · CHAPIN**

D I V I S I O N   O F   G E N E R A L   M O T O R S   C O R P O R A T I O N

**New Trend in Steel Buying:** Many profit-conscious manufacturers taking a long, hard look at steel buying policies; more and more of them cutting costs by purchasing more steel as it's needed and ready for production from modern Steel Service Centers.



## "Critically needed alloys make 24-hour deliveries a must!"



Prompt deliveries from U. S. Steel Supply help keep this F-27 production line on the move!

The Fairchild F-27, first American-made turbine-powered airliner.



says Mr. V. N. Thacker, Assistant Materials Manager, Fairchild Aircraft & Missiles Division, Fairchild Engine & Airplane Corporation, Hagerstown, Maryland

"We're now producing the first American-made turbine-powered airliner—the Fairchild F-27 Propjet," says Mr. Thacker. "Naturally, during the first months of production with an all-new aircraft modifications are necessary. But despite these changes, which result in last-minute orders, U. S. Steel Supply gives us delivery of the material we need . . . when we need it."

"Here's an example: We ordered 50 feet of 4130 steel, measuring  $\frac{3}{8}$ " x 1", which we

needed within 24 hours. Granted, it was a small order, but it was *vital* to the F-27. U. S. Steel Supply delivered it in less than a day, saving many valuable man-hours."

Why not take a close look at your steel buying policies—you'll find U. S. Steel Supply's pamphlet entitled "Value Analysis at Work" very helpful. Write to our Chicago Office, or call your nearest U.S. Steel Supply Steel Service Center. You'll find us in the Yellow Pages listed under *Steel*.

*USS is a registered trademark*

**U. S. Steel Supply**  
**Division of**  **United States Steel**

Steel Service Centers and Complete Steel Strapping Service at: Baltimore, Birmingham, Boston, Chicago, Moline, Cleveland, Houston, Dallas, Los Angeles, Memphis, Milwaukee, Newark, Southington (Conn.), Philadelphia, Seattle, Portland (Ore.), Pittsburgh, St. Louis, St. Paul, San Francisco. • General Offices: 208 South LaSalle Street, Chicago 4, Ill.



## Making High Quality Steel—At Low Cost

The growing demand for steels of increasingly higher quality has created a new kind of thinking. With conventional methods of obtaining both high quality and quantity being relatively slow, costly and often uncertain, more and more mills are turning to the modern Heroult Electric Furnace as the most reliable and economical means of making high-grade steel in large heats.

To keep abreast of this trend, Sharon Steel Corporation recently built a complete new Melt Shop at its Roemer Works in Farrel, Pennsylvania, and installed the large Heroult Electric Furnace shown above.

This 20' diameter furnace turns out 90-ton heats of top-quality stainless in less than 8 hours. Space has been provided for a second Heroult when it is needed.

Moreover, electric furnaces are proving to be more efficient and economical in producing most *any* grade of steel in large or small heats. This is because electric furnace operations require a smaller investment, usually reduce both power and charging costs and produce a more uniform product.

American Bridge, exclusive manufacturers of the

Heroult Electric Furnace, offers a complete electric furnace service. We have the facilities to handle the complete job—from foundation to furnace, from engineering to erecting. We are also prepared to modernize your old Heroult by installing improved new mechanisms that will increase the efficiency and productivity of your unit. And, if you own a Heroult, we can supply any needed replacement parts.

For more information, get in touch with the office nearest you.

*USS and Heroult are registered trademarks*



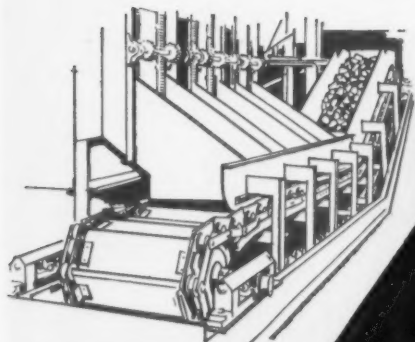
**American Bridge  
Division of  
United States Steel**

General Offices: 525 William Penn Place, Pittsburgh, Pa.

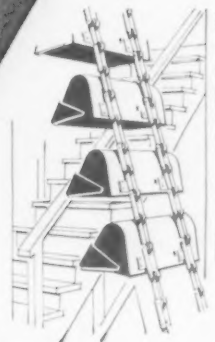
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bushed chain...**

# BUILT FOR THE LONG, HARD GRIND



**FLANGED ROLLER TYPE**  
for applications where  
the chain will oper-  
ate on various type  
rails.



**PLAIN ROLLER TYPE** for ap-  
plications where the chain  
will operate in channels,  
angle guides or vertically.

WHERE the going is tough—es-  
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—long-pitch SS class chain pays off in low  
initial cost and maintenance, fewer shut-  
downs. These heavy-duty chains conform to  
all commercial standards for clearance and fits;  
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Industry's most modern chain-producing facilities  
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chains and sprockets to suit specific applications. Get  
full facts from Catalog 1050. Write direct, or call your  
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... in the yellow pages of your phone book,  
under CHAINS.

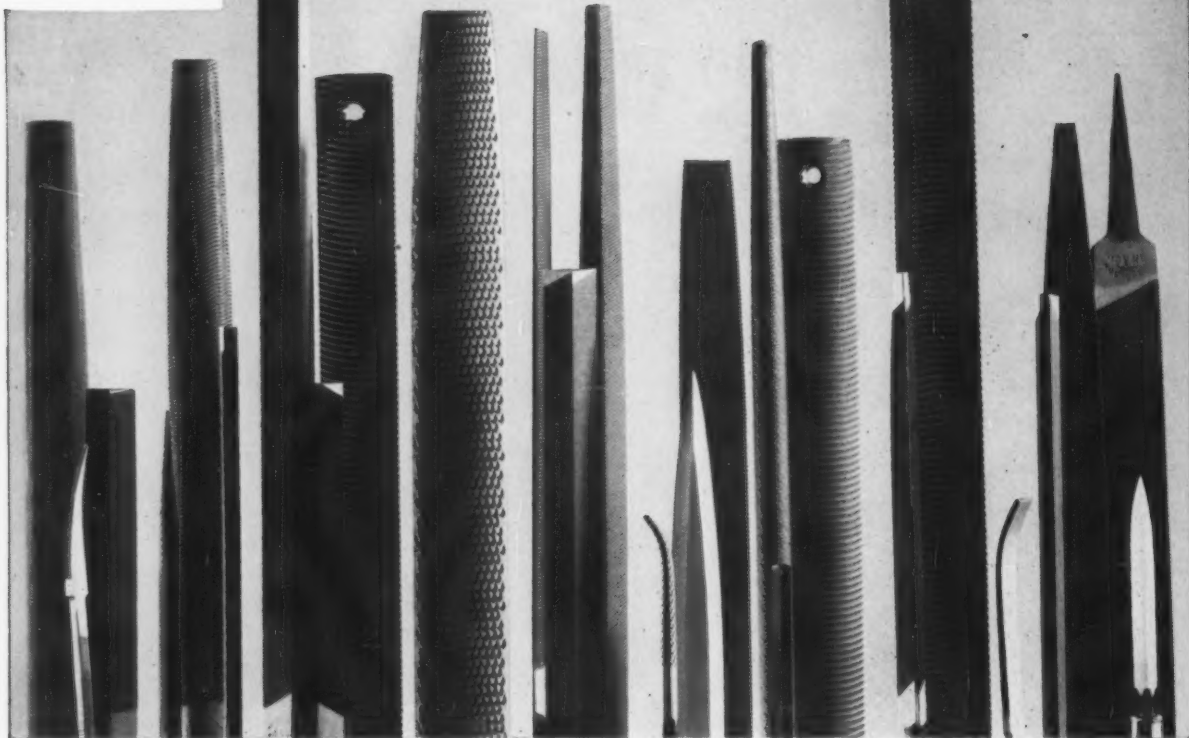
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**LINK-BELT COMPANY:** Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There  
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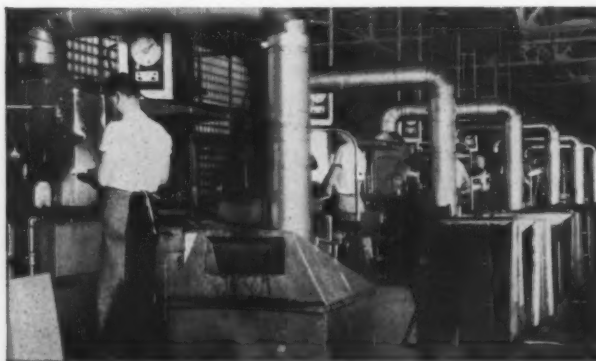
### File Hardening



Nicholson File Co.: Many thousand files are hardened daily; Speedomax control helps keep rejects to absolute minimum.

## Control of lead pot temperatures a problem?

Not at Nicholson File Co., Anderson, Ind., where Speedomax® H controllers are holding critical hardening temperatures to within  $\pm 5$  F. With file hardening an art, Speedomax H permits a skilled operator to devote all his attention to producing a hard, straight, undistorted file. Since installing automatic control, *rejects have been minimized . . . pot life has increased substantially . . . new-operator training time appreciably reduced.* Rugged, compact and completely reliable, Speedomax H is providing similar process benefits on numerous other heat treat operations . . . is helping both to modernize production and to produce a quality product. Whatever your heat treat, it'll pay you to investigate Speedomax H! For details, contact your nearest L&N office or write 4956 Stenton Avenue, Philadelphia 44, Pennsylvania.



With automatic control holding pot temperatures to within  $\pm 5$  F, skilled operators can devote all their attention to producing files which consistently meet maximum hardness and straightness specs.



**NORTHROP**  
Automatic Controls • Furnaces

**NEW General Electric  
Polydyne\* drive provides**

# **DEPENDABLE LOW-COST ADJUSTABLE SPEED**

**straight from a-c power in  
ratings from 1/4 to 25-hp!**

**You get all these  
PLUS VALUES  
with General Electric  
Mechanical Power  
Transmission Equipment**

**PRODUCT APPLICATION SERVICE**—G-E engineers are available to help you analyze and select the right equipment for your job.

**PROMPT SHIPMENT**—You get fast delivery on all standard General Electric units—from distributor or factory stocks.

**SALES SERVICE**—Your inquiries, quotations and requests for bids are handled promptly by G-E field service offices.

**AFTER SALES SERVICE**—50 G-E Service Shops and 500 authorized Small Motor Service Stations offer expert repair service on all G-E Gear Motor products.

**MANUFACTURER RESPONSIBILITY**—G.E. focuses manufacturing responsibility at one source, for it produces all gearing, components and motors in its line.

**MANUFACTURER REPUTATION**—Advanced technology built into G-E mechanical power transmission equipment assures you that it will meet your specifications—adds to and builds preference for your product.

General Electric's new Polydyne drive is a compact, completely packaged unit consisting of a-c driving motor, belt transmission, output gearing and control.

**NOW IN STOCK**—These factory- and field-tested drives are available in configurations and ratings to meet virtually all your requirements!

G-E Polydyne drive has a completely new control design that prevents binding or sticking of speed control mechanism, and it responds smoothly and quickly to speed adjustment. Polydyne mechanical adjustable-speed drive is the drive to use when and where you want:

- Most efficient process speed
- Maximum machine life
- Minimum maintenance requirements
- Machine versatility

**EASY MAINTENANCE**—Advanced design makes belt changing fast; reduces chance of damage to drive shaft and bearings during belt change and eliminates shaft realignment after change.

General Electric helical reducer gears can be removed as a unit for fast inspection, and Polydyne drives require minimum lubrication.

**FOR MORE INFORMATION** on G.E.'s complete PLUS LINE with Polydyne drive, contact your nearby G-E Apparatus Sales Office or Distributor, or write for bulletins: Polydyne Drive (GEA-6806), G-E Helical Gear Motor Line (GEA-6704), Shaft-mounted Speed Reducers (GEA-6616), Fractional Horsepower Gear Motors (GEA-6133A), Section 854-2, General Electric Co., Schenectady, N. Y.

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*Progress Is Our Most Important Product*

**GENERAL  ELECTRIC**

**Choose from General Electric's PLUS LINE of Mechanical Power Transmission Equipment**



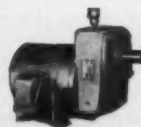
**Integral-type  
gear motor**



**Right-angle shaft  
gear motor**



**All-motor  
gear motor**



**Offset-shaft  
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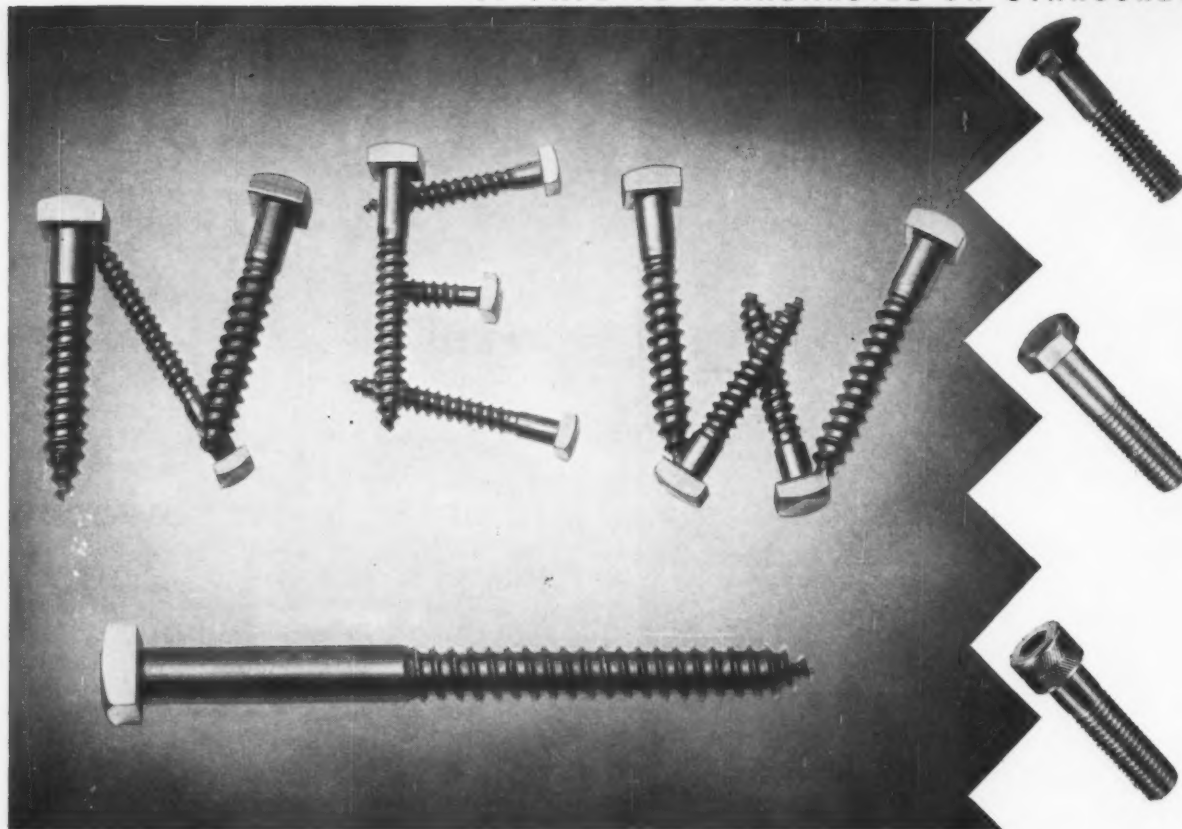


**Helical  
speed reducer**



**Shaft-mounted  
speed reducer**

IT PAYS TO STANDARDIZE ON STANSCREW



## Lag Bolts Expand Stanscrew Line To Over 5,500 Different Fasteners

Hex machine bolts . . . carriage bolts . . . and now, a broad selection of lag bolts . . . all quickly available from Stanscrew.

These new gimlet point lag bolts, all with full-sized shanks, conform to ASA Standards and are produced to Stanscrew's rigid criteria of fastener quality. Almost 100 sizes are offered as stock items.

With lag bolts, the Stanscrew line now covers more than 5,500 standard catalogued fasteners . . . carefully developed to answer the overwhelming majority of American industrial needs. Included are socket, set, and cap screws . . . nuts . . . dowel and taper pins . . . pipe plugs . . .

studs . . . and, of course, Stanscrew's complete bolt series.

Each of these 5,500 fasteners is always in stock at three conveniently located plants. A rigidly enforced Stanscrew policy assures regular orders are shipped within 24 hours. This means your Stanscrew distributor can provide especially fast service on all occasions . . . and be particularly helpful in emergencies.

*Your Stanscrew distributor will also be happy to arrange a visit from the Stanscrew fastener specialist. His recommendations on your assembly procedures can often result in significant savings. Why not call your Stanscrew distributor today?*

**STANSCREW**

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The film clip is taken from a Texaco movie about grease, called "Shear Magic." It shows a grease-lubricated roller bearing that has literally been eaten up by rust because improper lubricant was used.

To help you take steps to prevent this same occurrence "Shear Magic" presents the latest advances in greases and grease-testing methods.

You will see how *only* the right greases protect against heat, water, cold, dust, shock, and other conditions. You will find out about new greases, their components and capabilities.

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There is no "hard sell" in "Shear Magic," only informative talk. Texaco will be glad to arrange for a showing of the 25-minute sound film right in your plant. To start the projector rolling, just mail the coupon.

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Please send me information about a free showing of "Shear Magic" to my organization.

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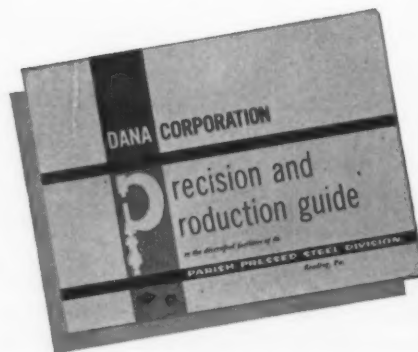


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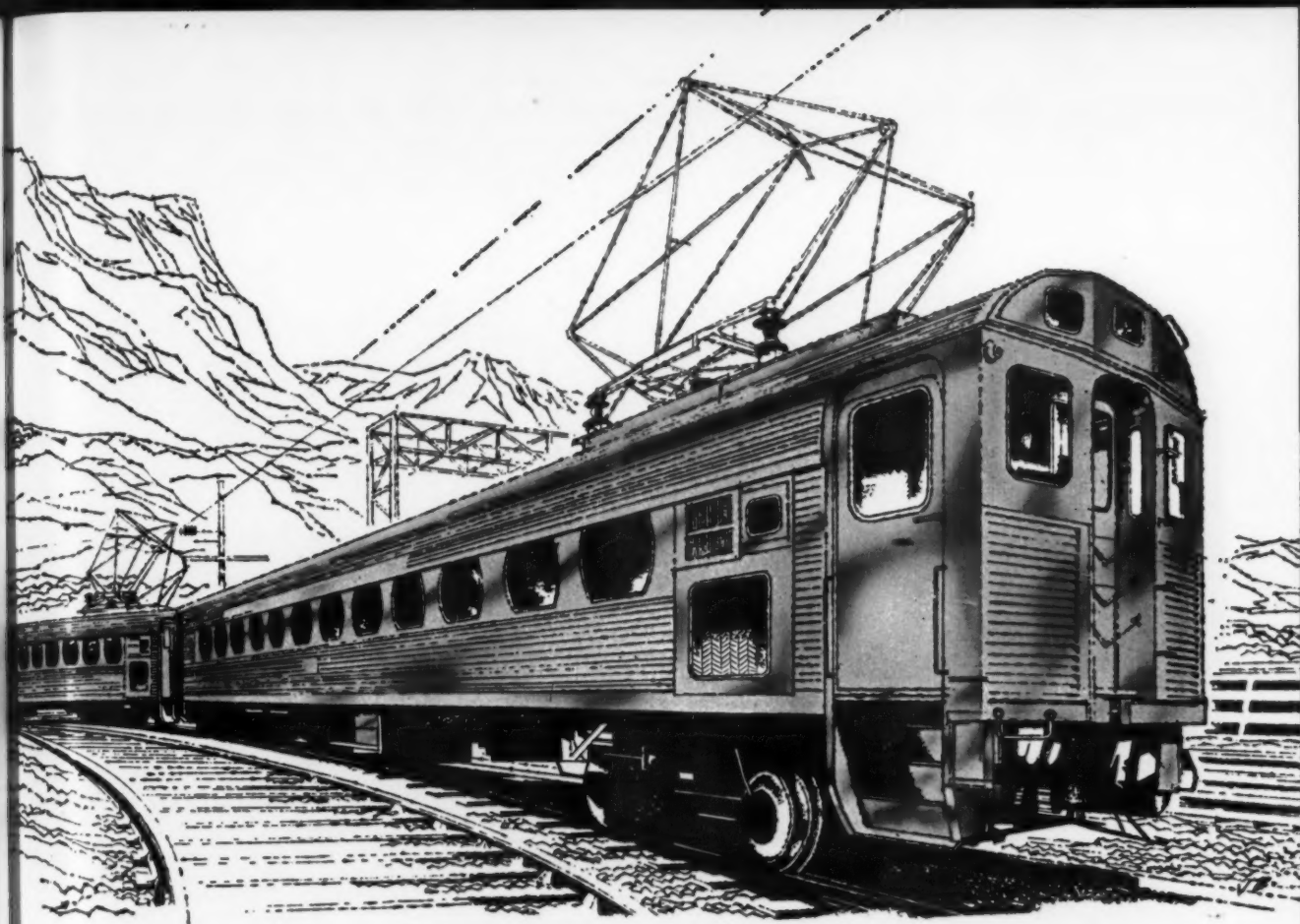
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Because it makes practical use of the remarkable strength-weight ratio of the austenitic stainless steels, this all-stainless steel railroad passenger car weighs **25 tons less than other so-called modern equipment.**

It is an important contribution to railroad operating economy and efficiency because its stainless steel structure guarantees millions of miles of service between overhauls—its gleaming exterior requires no paint.

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In your product engineering when weight is a problem and strength a necessity the answer can be found in stainless steel's unique combination of strength, durability and beauty.

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Arthur H. Smith and Robert Cross are partners in a machinery business. Their company has grown over the years and looks to a prosperous future. Both Smith and Cross are known as good businessmen. They are aware that when either of them dies the partnership, by law, ceases to exist. The surviving partner and the heirs of the deceased partner are left to pick up the pieces. Therefore, with the help of their Aetna Life representative, attorney and accountant, they set up a plan to assure continuation of the business and security for their own families. If you own or operate any kind of business, it will pay you to investigate the vital need for a business continuation plan — and no one is better equipped to serve your interests than the Business Planning Department of your local Aetna Life General Agency.

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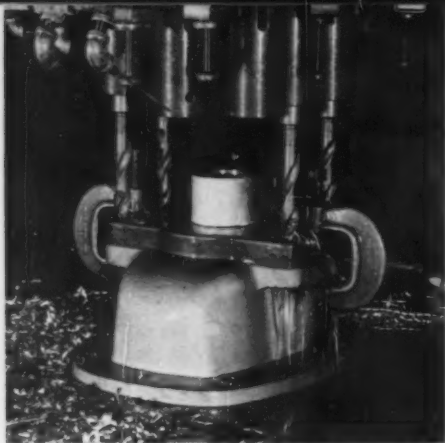


**"Our first Natco ran twelve years  
without an overhaul!"**

*— says Harry L. Morley, plant manager of Alloy Steel Products Co.*

(see other side)





From this job drilling four  $\frac{1}{4}$ " holes in a stainless steel casting . . .



The operator changes the set-up to eight  $\frac{1}{4}$ " drills in new locations . . .



And starts up again on the new job with only 15 minutes downtime.

## "We can change set-ups in 15 minutes or less."

Now, five multiple-spindle Natcos keep production moving at Alloy Steel Products Company, Linden, N. J. Alloyco makes industrial stainless steel valves for the chemical, petrochemical, synthetic fiber, missile and atomic power industries.

**Ideal for stainless**—Alloyco's materials are hard-to-machine stainless and corrosion-resistant alloys. The steady hydraulic pressure of Natco machines keeps the tools moving into the work and gentles them through the critical break-through point. There's no ease-up to let work hardening start. Drill life stretches out.

**Ideal for short runs**—Alloyco's production runs

aren't long, ranging from 10 to 400 pieces (100 pieces is average). With such short runs, fixtures have to be simple to pay off.

**Ideal for cutting costs**—An inexpensive guide plate is C-clamped on the face to be drilled and they see no need to fasten the part to the table. Natco C3Bs' accurate alignment, rigidity, lack of vibration and steady feed pressure frequently make permanent fixtures unnecessary.

With a single Natco multiple-spindle machine in your plant you add the productivity of a whole battery of specialized drilling, tapping, and boring machines. Call your Natco representative today.



Multiple-spindle drilling, boring, facing and tapping machines.  
Special machines for automatic production. Injection molding machines.

NATIONAL AUTOMATIC TOOL COMPANY, INC., RICHMOND, INDIANA

# A New Era in Relay Life and Reliability



**NEW**

Bulletin 700,  
Type B-220A,  
AC Control  
Relay with  
2 N.O. and  
2 N.C. contacts.



**NEW**

Bulletin 700,  
Type BX-440A,  
AC Control  
Relay can be  
wired for  
normally open  
or normally  
closed contacts.

## NEW ALLEN-BRADLEY BULLETIN 700 RELAYS

### Improved features set new performance standards

For years, Allen-Bradley Bulletin 700 Type B and Type BX relays have been preferred for their long life and trouble free operation. The improvements in the new Bulletin 700 Type B and Type BX relays will set new performance standards wherever they are used. Naturally they use the famous A-B double break, silver alloy contacts which always remain in perfect operating condition without cleaning or filing. The cast coil cannot be damaged by the severest atmospheric conditions.

These new Allen-Bradley Bulletin 700 Type B and Type BX relays offer even greater value and greater reliability than ever before—but the price has not been changed.

- New mechanical design gives at least 5 times greater operating life.
- New contact motion provides 10 times greater electrical reliability.
- Complete interchangeability—mounting dimensions are unchanged.
- New hermetically sealed plastic coil fits Bulletin 700 relays presently in use.
- New, stronger, movable contact crossbar—also fits old relays.
- New reinforced stationary contact blocks—interchangeable with previous design.

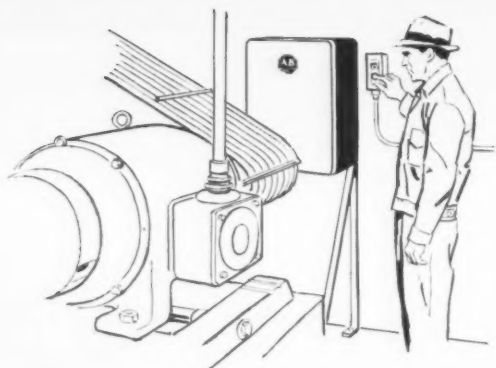
Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.  
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

9-59-MR

# ALLEN-BRADLEY

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## Quality Motor Control

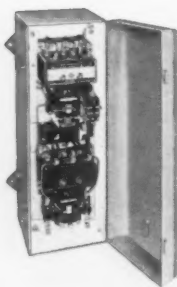


## WHEN REDUCED VOLTAGE STARTING IS A MUST

Only Allen-Bradley  
can provide all the answers

The Allen-Bradley line of reduced voltage starters makes possible a selection of the best starter, not only to meet the power company's requirements but also to provide the best starting conditions for the motor and the "load" that it drives.

The simple solenoid contactors in A-B reduced voltage starters have only ONE moving part—assuring millions of trouble free operations. And their double break, silver alloy contacts never need costly maintenance. Accurate, reliable overload relays protect motors against burnouts. Write for Publication 6088.

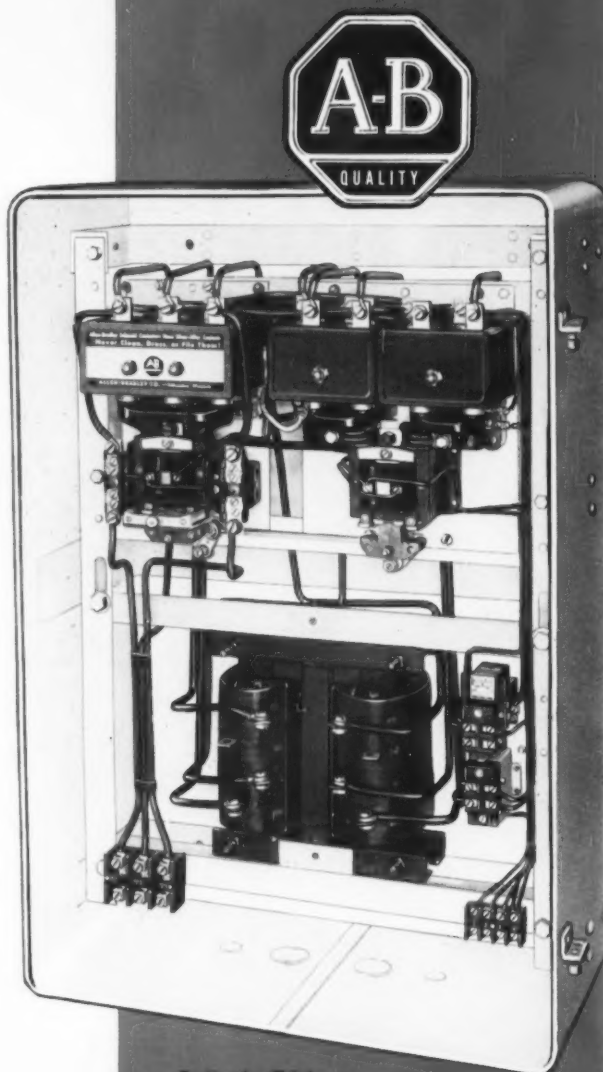
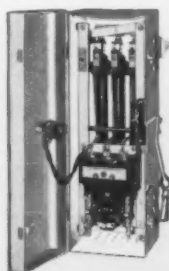


### Bulletin 740

Graphite disc resistors are automatically inserted in series with the squirrel cage motor at starting, and they are automatically cut out after a pre-determined time. Turning a single screw on the starter frame adjusts the compression resistors exactly to motor and load conditions for velvet smooth acceleration. Ratings to 200 hp, 220-440-550 v.

### Bulletin 640

Where remote control is not needed, these graphite compression disc resistor starters provide stepless acceleration of squirrel cage motors. Operated by hand lever, the smooth starting of the motor is under the control of the operator. No-voltage and dependable overload protection is provided. Ratings to 200 hp, 220-440-550 v.



### Bulletin 746

Automatic reduced voltage starter for squirrel cage motors that should not be started on full line voltage. It employs autotransformer connected in open delta to reduce line voltage during starting. Adjustable timing relay controls starting period. Taps are provided on the autotransformer to adjust the starting voltage applied to the motor. Ratings to 300 hp, 220 v; 600 hp, 440-550 v.

# ALLEN- BRADLEY

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## Quality Motor Control

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.  
In Canada: Allen-Bradley Canada Ltd., Galt, Ont.

# Specify **SANDVIK** *Precision-Tailored* **Spring Steel**

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EDGE FINISH PLUS SPECIFIC  
PHYSICAL PROPERTIES**

When you require specific physical properties combined with accurate dimensions in spring steel, call Sandvik.

From composition, through processing to the finished strip, Sandvik has had long experience in precision-control. That is why you find Sandvik steels used for feeler gauges, watch springs, compressor valves, camera shutters, reeds, shock absorbers and many other exacting spring steel applications.

Sandvik supplies cold rolled specialty strip steels —

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Sandvik stocks a wide variety of qualities and sizes. In addition Sandvik has Rolling, Slitting, Edge-Filing and Hardening and Tempering facilities.

#### **NEW, FREE BROCHURE**

Gives Specific Data On Sandvik Cold Rolled and Hardened and Tempered Strip Steels. Catalogs leading types by application and lists finish, usual size range and chemistry. Send for your copy today.



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## You get steel + plus from U.S. Steel



**"I sold them a type of steel that helped double their production"**

**SAYS ALBERT A. FERNQUIST  
U. S. STEEL SUPPLY SALES REPRESENTATIVE, CHICAGO**

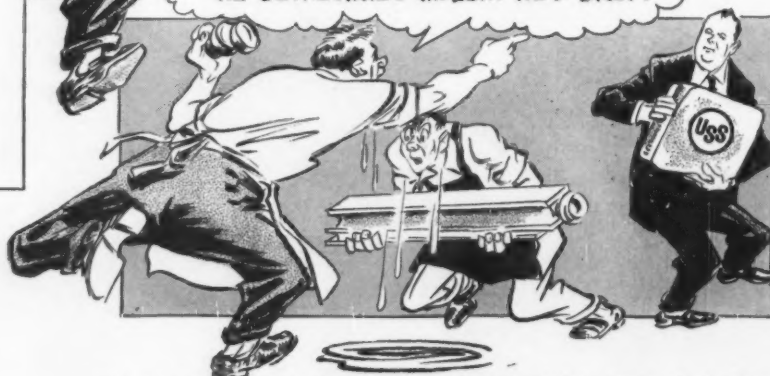
"Mr. O. G. Olmsted and his son operate a small machine shop in Chicago. They make a wide variety of steel products . . . from a small camera accessory to a 'fat-back' skinner for meat packing. On a visit to their shop I heard them complain that they had to shut down about ten times a day to re-sharpen tools and bits.

TEN TIMES A DAY  
THE TOOLS GOT DULL  
AND SO WE'D  
HAVE TO STOP...

"Excessive downtime can kill a small business. So, at the Olmsted's' request, I looked into every phase of their operation—their tools, types of contracts, types of steel used. Then I talked over the problem with some of our technical experts at U.S. Steel. Their recommendation—a switch to MX, one of the family of USS Free-Machining Steels.

"Today, 98% of the steel the Olmsteds buy is MX, and because of its better machineability, tools only have to be resharpened once every two days. Olmsted production has doubled—for which they give MX a good share of credit—and tool life has been increased 500%!

...THEN WORK SO HARD TO MAKE UP TIME  
WE SOMETIMES THOUGHT WE'D DROP!



"It's a help to have the full facilities of U.S. Steel behind you when you're dealing with fine customers like the Olmsteds."

When you buy from U.S. Steel you get steel plus technical assistance . . . research . . . facilities . . . marketing assistance.

USS and MX are registered trademarks

...BUT NOW  
WE'VE LEARNED FROM  
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WE ONLY NEED TO  
SHARPEN TOOLS ONCE  
EVERY OTHER DAY!



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United States Steel Export Company

**United States Steel**

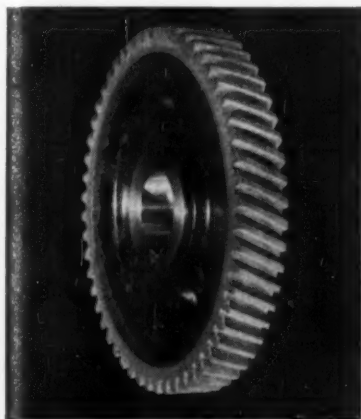




# PROGRESS IN PLASTICS

## CDF CELORON GEARS ARE QUIET, WEAR LONGER

**Why plastics for gears?** Because laminated-rim molded Celoron® gears are *quiet* (eliminate the annoying noise of chain timing and metal-to-metal gearing). Because they reduce heat and wear on mating metal gears, thereby reducing repair costs and preserving accuracy throughout the life of the engine.



**Strength.** Stamina is built into every CDF Celoron gear. Stronger teeth, longer running life, and smoother performance are characteristics of the Celoron gear. No type of "cheaper" gear construction has yet proved as satisfactory.

**What it is.** Each CDF Celoron gear blank is molded of laminated and macerated cotton cloth impregnated with a special phenolic resin. Gear teeth are cut in the laminated rim.

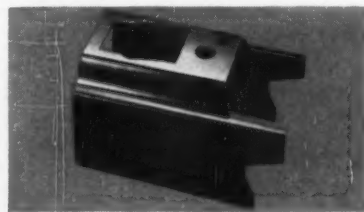
Repeated tests prove the high impact strength, the great wear-resistance, and the low tone frequency of this "silent" gear material.

Design and purchasing men interested in adapting Celoron gears for engineering and other needs may obtain full technical data (properties, horsepower ratings, etc.) by writing to the Celoron Division of CDF at Bridgeport, Pennsylvania.

## COMPLICATED PLASTICS PARTS AT LOW COST THROUGH POSTFORMING CDF DILECTO

**How it's done.** Briefly, postforming is effected by heating a special grade of CDF Dilecto® laminated plastics until it's pliable, and then forming it in an unheated, inexpensive mold.

**Less expensive.** When you postform Dilecto parts, you generally save money all around: Lower die costs (often wood or plastics is entirely satisfactory); lower retooling costs to meet new specifications; lower labor costs—these are a few of the savings made possible through postforming of Dilecto.



**Why Dilecto?** Where you need high strength-to-weight ratio, superior electrical and chemical properties, light weight, easy machinability, and excellent resistance to abrasion, weathering, and moisture—CDF Dilecto laminated plastics give you the best combination. CDF delivers either the Dilecto stock or the completely fabricated parts as specified.

**Special Dilecto grades.** For better response to severe bends and deep draws, and for the ability to take the most involved forming without fracturing, choose one of the special postforming grades of Dilecto, described in CDF Technical Bulletins 11,110 and 11,140. Most of the standard Dilecto grades, though, can be postformed to some degree.

## SMALL ELECTRICAL PARTS BY THE MILLIONS

CDF specializes in the complete fabrication of plastics and fibre components for automotive and aircraft use. These breaker-arm bushings were made from



Dilecto tubing on automatic screw machines, by men who know best how to cut costs in working laminated plastics. Investigate CDF's extensive fabricating facilities—let CDF do the whole job, and assure your own production deadlines.

**NEW CDF LITERATURE** • For Bulletins referred to in this advertisement, or for recommendations relating to your current problem in electrical insulation, send this coupon.

Please send the following Technical Bulletin(s):

- ☐ Celoron Molded Gears, Bulletin C-58
- ☐ Dilecto Postforming Grades, Bulletins 11,110 and 11,140
- ☐ Please have a CDF representative call to discuss my electrical-insulation problems in detail.

Name \_\_\_\_\_ Title \_\_\_\_\_

Company \_\_\_\_\_

Street Address \_\_\_\_\_

City \_\_\_\_\_ Zone \_\_\_\_\_ State \_\_\_\_\_



**CONTINENTAL-DIAMOND FIBRE**

A SUBSIDIARY OF THE *Buhl* COMPANY • NEWARK 83, DEL.

In Canada: Continental-Diamond Fibre of Canada Ltd., 46 Hollinger Road, Toronto 16, Ont.



## Slammin' Sam Snead fails to flake Inland TI-CO®

As one of golf's great players, Slammin' Sam earned his name and fame with a driving power that has seldom been equalled. His swing is deceptively easy—yet it drives the ball with astounding force and speed. At Boca Raton, Sam drove ball after ball into an Inland TI-CO galvanized sheet. Each impact was terrific. One would expect such punishment to be devastating, yet, though the TI-CO sheet was

battered and dented—*there was no flaking of the zinc coating whatsoever!*

All year 'round in product fabrication and assembly; in a limitless variety of commercial and residential applications; Inland TI-CO regularly takes equally tough treatment—deep-drawing, spinning, Pittsburgh lock-seaming, crimping, punching, hammering—*without cracking, peeling or flaking!*



Sam couldn't believe it either 'til he examined the TI-CO sheet for himself. *Not a trace of flaking!*

Consult your Inland Representative regarding your galvanized sheet or coil requirements. And send for your free TI-CO booklet containing technical data and complete information. TI-CO is produced with dry, oiled or chemically treated surfaces in sheet and coil form in a wide variety of gages and widths.



### INLAND STEEL COMPANY

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SHORT-TERM BUSINESS PLANNING IS AT the crossroads. If steel is moving in good supply soon, the economy will take off like a rocket. An all-time rate of Christmas buying is predicted, if strike-idled workers are back on the job. (Particularly if they aren't worried about a renewed strike if Taft-Hartley fails.)

AT THE INDUSTRIAL LEVEL, CAUTION is the word. The October survey of the National Association of Purchasing Agents reports that few P.A.'s feel like extending their commitments while the steel shortage is critical. On the other hand, they do not want to be caught short in face of the expected post-strike boom.

MACHINE TOOL BUILDERS AND TOOL AND DIEMAKERS are getting good orders for next year. Many customers are continuing to buy, even though their own plants are idle, or are threatened by idleness. Cutbacks and delays are occurring, but it's a spotty development and not yet a trend.

SPACE AGE HIGH MELTING POINT DEMANDS are booming refractory metals sales. And producers are replying with more work to push operating temperatures higher by developing new alloys. Some steel companies are reported on the verge of going into this business with big, new plans.

WHY ARE TRUCK MAKERS ENJOYING THE biggest sales year since 1955? And further, why do they look for another, maybe bigger year in 1960. An analysis by the Value Line investment survey reports that the increasing share of freight carried by trucks, establishment of shopping centers and plants removed from rail tracks, dictate a strong truck demand for some time.

AUTO PRODUCTION IS DROPPING FAST, and it will be weeks before it starts to reverse the downtrend. The rate of decline is sharp. Production for the week ending Oct. 31, shortly after the cutbacks started, was 117,801 cars and 16,185 trucks. Last week totals were 65,369 cars and 14,079 trucks.

HERE'S AN IDEA OF WHAT TO EXPECT in the nation's work force in the next ten years. A top specialist in the field predicts the next decade will see 26 million come into the work force and 12 million will retire. Biggest gains are expected in workers under 25. In jobs, technical, professional and retail work will find the biggest gains. Farm employment will drop the most sharply.



even out in the dusty "oil patch" these rugged  
Cleveland's give year 'round trouble-free service

Here, two type-CU Cleveland Worm Gear Drives are busy at work on an oil field processing plant's gas cooler. These rugged Cleveland's are extensively used to drive induced draft fans for cooling large volumes of process water.

They're especially engineered to take the high thrust loads imposed by propeller fans, as well as high radial loads that can result from fan unbalance or flutter.

Whenever you need a quiet, powerful, right-angle drive, specify Cleveland's. Write today for your free copy of Cooling Tower Drive Bulletin 135-S. It contains dimensions, cutaway views, rating tables, charts and information on cooling tower drive selection.

The Cleveland Worm & Gear Company  
3282 East 80th St., Cleveland 4, Ohio

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Eaton Manufacturing Company

Affiliate: The Farval Corporation



**CLEVELAND**  
Worm Gear  
*Speed Reducers*



**R. BUCKMINSTER FULLER** explains his Octet Truss to Eric West (left), president, Aluminium Ltd. Sales

Inc., and Arthur Drexler, director of architecture and design, Museum of Modern Art, New York City.

## Bold Building Concepts Mean New Markets for Metals

**Even the most practical designers now admit the spectacular ideas of R. Buckminster Fuller will work commercially.**

**His new concepts are of vital importance to metal fabricators.—By F. J. Starin.**

■ Back in the summer of 1956 a DC-4 set down in Kabul, Afghanistan, to unload a cargo which included some three-inch aluminum tubes, some aluminum disks shaped like auto hubcaps, plastic coated nylon, and one American engineer.

The U. S. had belatedly decided to enter Afghan International trade fair. Pavilions to display the wares

of other nations had been under construction for as long as five months. The one American engineer took his cargo, hired a crew of local laborers, and in only 48 hours put up the sensation of the show—a geodesic dome designed by R. Buckminster Fuller.

**Leading the Way** — Over the years, Mr. Fuller and his theories have been controversial. But now even the most practical designers are convinced R. Buckminster Fuller is one of the leaders in charting the future of world building.

And these trends will be of great importance to metal fabricators. Says Mr. Fuller, "For thousands of

years people have been building the same way, stone-on-stone, depending on compressive strength. But in the last 25 years metals have made great strides in developing tensile strengths that should be more efficiently utilized."

**Ford's Dome**—He has done some of his most dramatic work with aluminum, magnesium, monel, stainless and alloy steels. For instance, when the Ford Motor Co. planned to dome its rotunda, it was discovered the structure wouldn't support the 160 tons a standard dome would weigh. Mr. Fuller put on an aluminum geodesic dome that spanned



**PRACTICAL:** Ceiling of the Citizens State Bank of Oklahoma City is gold anodized aluminum geodesic

dome. The building shell is another, much larger, geodesic dome designed by Mr. Fuller.

93 ft and weighed just  $8\frac{1}{2}$  tons. And he did it in 30 days.

The Ford geodesic dome illustrates another reason Mr. Fuller likes to work in metal—what he calls “cleanliness of tolerances.” Says the designer, “I found I was able to reduce the tolerances in size and matching up of rivet holes. It enabled me to almost double the strength, which helped reduce the weight.”

**Metals Advantages**—Metals also fit into R. Buckminster Fuller's plans because of their “controlled strength”—equal reliability at any point on a structural member.

Also, the metals industry is set up to mass produce and mass distribute better and more efficiently. And this is vital to the Fuller concepts.

But metals are not unchallenged. To date, plastics account for the biggest share of the total dollar sales of geodesic structures.

**Work for DEW**—One of Mr. Fuller's most successful efforts is the Radome—a fiber glass sphere to protect radar on the Distant Early Warning Line, guarding our northern flank in the arctic. Lincoln Laboratories of Massachusetts Institute

of Technology, in charge of DEW line shelters, found the Fuller Radome would stand up to over 200 mph winds, promptly ordered 1000, now in service on the DEW line.

What would the world look like covered with domes? It is the basic geodesic principle that counts, Mr. Fuller says. We can make a geodesic building in just about any shape.

Patents cover geodesics and all other Fuller discoveries. But there are now over 200 licensees. And Mr. Fuller reports a license, with no advance royalties called for, is easily obtained on application to him.

Right now there are two experimental Fuller structures in the gardens of the Museum of Modern Art, in New York City.

An 18 ft monel and aluminum mast has no function but demonstrate Mr. Fuller's “tensegrity theory.” The word is a combination of tensile strength and integrity. The possibilities here are vast. This type of structure actually gains strength as it gets larger.

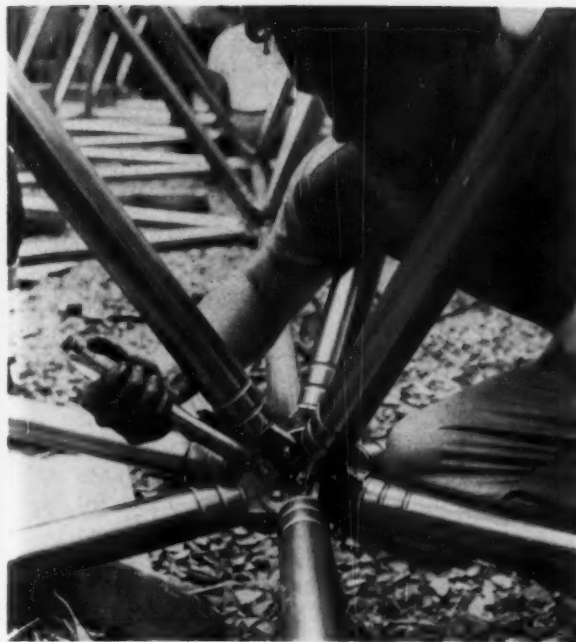
**Back to the Atom**—Next to the tensegrity mast in the garden is a

gold anodized aluminum octet truss, latterly demonstrating the basic principles on which the geodesic dome is based. Mr. Fuller maintains the greatest stiffness is gained from octahedrons and tetrahedrons.

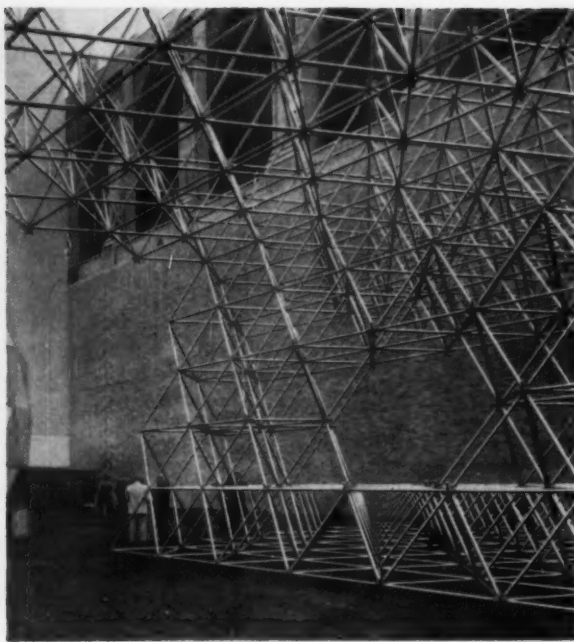
In the truss he has assembled 2380 aluminum tubes with cast aluminum insert ends, in octahedron patterns. It is 100 ft long, with 60 ft of this cantilevered 20 ft off the ground.

**New Alloy Used**—The aluminum is a new structural alloy, Alcan B51-S, developed by Aluminium Ltd. According to Eric F. West, president, Aluminium Ltd. Sales, when Aluminium Ltd. decided to contribute a prototype of Fuller's octet truss to the museum show, they had two basic purposes in mind. First, to demonstrate the great structural strength of some of the newer aluminum alloys. And second, to stress Aluminium's continuing effort to open new fields of applications for aluminum.

Mr. Fuller foresees this type of structure being used for airport hangars, shopping centers, terminal buildings, schools, and industrial plants. He maintains use of this framework would cut overall con-



**SIMPLE:** Fuller Octet Truss at the New York Museum of Modern Art shows how quickly and inexpensively



Fuller buildings can be assembled. Cast aluminum inserts are bolted together in pattern desired.

struction costs as much as 50 pct.

**Airborne Delivery** — "An enormous jig could be built at the factory," he suggests. "The pieces to make the skin could be automatically placed and welded. And the whole thing would still be light enough to deliver, completed, by air."

Standing with the tensegrity mast and the octet truss at the museum is a plastic Radome—the only one of the three structures that is commercial. And it's an efficient challenger to metals.

**Projects Planned**—Mr. Fuller has many other projects working. And most of them could mean a market for metalworking. Some of his visionary projects are undoubtedly some years away—space islands, submarine islands for deep sea exploration, entire enclosed sections of a city, and a completely covered athletic field.

Discovery of tensegrity — where strength increases with size — has brought a number of these closer. Still missing is the necessary economy of mass production.

For instance, Fuller estimates the

shell for a field house for a college could be constructed for about \$10 per ft, figuring about a 400 ft geodesic dome. This is competitive with other building methods, such as concrete. But if as few as 10 of these were built, mass production and mass distribution techniques would reduce the cost to about \$5 per ft.

**Changes Coming**—But there are lots of things likely to change within a few years in building and construction. For one, Mr. Fuller is now considering the possibilities of his geodesic structures to house atomic energy power units.

The problem is the damage an explosion could do. Right now they're using battleship plate for compressive strength. With geodesic design, Mr. Fuller believes the greater tensile strengths of metals can be used with a saving of weight and money.

**The Basic Goal**—But R. Buckminster Fuller's real goal is much more basic than that. Long ago he decided there as a tremendous lack of progress in one of man's most basic needs—shelter. He resolved to do something about this.

His approach: Do away with unnecessary functions and get high performance from those retained. And he believed buildings would have to be made light enough for air delivery because the highest cost factor is on-the-site construction.

Will the public accept R. Buckminster Fuller's spectacular ideas and open the door to a gigantic metalworking market? Evidence indicates it has.

**Largest Clear Spans**—Mr. Fuller has built two of the largest clear span buildings in history, welded steel—for about \$1 million each.

And the American Society of Metals, wanting to use metals most efficiently in an ultra-modern way, selected the work of architect John T. Kelly for its new headquarters at Novelty, O. Its dominating feature is a "space lattice"—an adaptation by R. Buckminster Fuller of his geodesic dome.

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# T-H Won't Budge Negotiators

**Steel stocks run out as union and companies stand firm.**

**Other industries indicate they will follow steel's stand in negotiations.—By Tom Campbell.**

■ Approval of the Taft-Hartley Act by the Supreme Court will have no effect on steel labor negotiations. Nor will it help most steel users in the immediate future. Put bluntly, the 80-day cooling off period will heat up both sides.

After a 116-day strike (and before that, 2½ months of "bargaining"), it would be naive at this stage to look for a quick voluntary settlement.

Privately most steel officials see no settlement ahead. Neither do steel union officials. High government officials are also stymied.

**Bottom of the Barrel**—Most steel is in the hands of fortunate manu-

(For immediate effects of T-H injunction, see P. 205.)

facturers. Other steel users are about ready to close up shop. There just isn't enough steel to support a major operation.

Steel officials were busy last week and early this week sending letters on their last offer to employees. This is a trial run before wording on a National Labor Relations election ballot is decided. If there is no settlement by the 60th day of an injunction, workers must vote on the companies' last offer.

**Campaign Tactics**—The major hurdle the steel company communications experts have to get over is to put the local practices arbitration offer in simple—and understandable—English. It is a foregone conclusion that the union will also send out letters labeling the arbitration offer a phony.

That both sides are girding themselves for an election 60 days away suggests the complete hopelessness of the situation. Federal mediators had had some forlorn hope that the company arbitration offer could be loosened up a bit to include refer-

ence to the union's position on the local practices clause. It sure was forlorn.

**No Change**—Union officials are adamant that there be no change in the 2-B clause in whatever contract is signed. This, they insist on, no matter what is agreed to on study or arbitration. The steel side—collectively—says "nothing doing." Among the 11 firms are some who are beginning to work up a solid distaste for the word "language" but that has no bearing on the solidarity of the companies.

From Washington come vague hopes that the President will do this or that. But they remain vague and probably without substance. If Ike does act arbitrarily it will come as the biggest surprise of all.

**Steel Not Alone**—The steel industry stand is by no means a parochial affair. Every other basic industry is—and will be—affected by what steel has done and will do. In the background are top corporation lawyers for many large firms—and industries—who welcome and applaud the stand of the steel firms.

There are new signs that the railroads, the copper industry, shipping groups, and hundreds of lesser firms have made up their minds to "make the fight" against union monopoly and wasteful practices. They figure it might as well be now as any other time. So whatever steel does or doesn't do will determine just what success or failure other management groups will have.

As far as can be learned, there will be no give at all in the steel side other than the latest 10¢ an hour wage cost increase and an offer to arbitrate the 2-B language.

Nor is there any give in the union except its last offer of 11¢-an-hour-or-so plus studies of 2B and other contract features. Both sides deny the figures of the other—the major differences being in the estimates on fringe benefit costs.



**PROBLEMS AHEAD:** Furnace damage like this, inspected by Great Lakes Steel Corp. president W. D. MacDonnell, indicates some of the problems steelmakers face before steel can begin to move after the startup.

## Refractory Metals at a Glance

### THESE REFRACTORY METALS—

Columbium	Tantalum	Zirconium	Molybdenum	Tungsten	Vanadium	Chromium	Beryllium
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### ARE AVAILABLE IN—

Wire, rod, sheet, foil, bar, powder, plate, ingot.	Bar, sheet, wire, foil, plate, powder, ingot, tube.	Rod, wire, sheet, foil, tube, plate, ingot.	Bar, wire, sheet, powder, plate, tube, ingot.	Bar, wire, sheet, powder, plate, ingot.	Sheet, bar, wire, tube, plate, powder, foil.	Bar, tube, powder.	Tube, sheet, plate, powder, shapes.
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### CAN BE FABRICATED AS FOLLOWS—

Forge, cast, extrude, spot, inert arc & roller weld, spin, machine, braze.	Grind, electron beam & spot weld, braze, sinter, machine, spin.	Extrude, machine, forge, cast, grind, braze, rivet, inert arc weld.	Forge, cast, extrude, weld, rivet, braze, spin, sinter.	Slip cast, sinter, hot spin, grind, braze.	Extrude, forge, machine, shielded arc weld.	Hot extrude, machine, braze, weld.	Forge, extrude, machine, braze, flash butt weld, deep draw, sinter, shielded arc.
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## Refractory Metals Are Booming

**Space age demands for higher melting points are pushing refractory metal sales way up.**

**Many producers report they have already topped last year.**  
—By K. W. Bennett.

■ The heat is on. Missile makers seeking metals that retain strength at over 1500°F are booming refractory metals.

At the American Society for Metals' Chicago Exposition, Kawecki Chemical Co. said it expected 1959 sales to hit \$4.5 million. This would be 90 pct over 1958 sales.

Fansteel Metallurgical's president, Dr. Frank Driggs, commented, "1960 should be a year of outstanding growth in applications and uses of the refractory metals." Fansteel sales thus far this year are \$23.2 million against \$18.8 million in the same period last year.

**Big Gains** — Union Carbide Metals Co. reports a seven-fold gain in vanadium sales thus far this year over last year's total. Mr. K. C. Li, Jr., Wah Chang operations vice president, reports his firm will

boost sales of columbium, tungsten, and tantalum by 50 pct. N. W. Bass, Brush Beryllium, says his company is producing at full 15,000 lb-per-month capacity.

With a keen eye on the refractory metals, several steel firms are seeking quotations on vacuum melting equipment that would put them in the refractory metal producing group. Three are there already.

At least one steel firm, Midvale-Heppentall Co., is expected to announce a first in vacuum steel, as well. Reports at the exhibit suggest the firm will produce 40-in. diam, 25 ton vacuum melted ingots. The furnace, by Consolidated Vacuum, is the largest of its type.

**Sales Boost** — Spurred by the space race and new, "hot end" reactor needs refractory fabricators already are called for metal parts that will withstand 2400°F operating temperatures. Once this hurdle is passed, designers are waiting with missile blueprints that will impose at least 3500°-4000°F. temperature requirements.

Molybdenum and beryllium honeycomb for highspeed aircraft

are already under test. The man-in-space capsule uses beryllium base plate of forging quality 80 in. Diam, two in. thick.

**Pure Work**—Much work is being done in the pure refractory metals. But metallurgists expect new classes of alloys to carry the brunt of missile-aircraft development. A vanadium-titanium-tantalum alloy is forecast by an industrial producer. A vanadium-titanium-columbium alloy went under study last month. Pure chromium with 10-30 pct tungsten is sought by fabricators of space equipment, though the material is not commercially available.

As temperature requirements move past the 1700°F mark, researchers seem to be moving away from nickel-iron-cobalt alloys. Still in reserve is hafnium carbide, pushed by Wah Chang Corp. Near-est thing to it is tungsten.

Many researchers are predicting a strong future for columbium, although it resists corrosion much less than most of the refractory metals. It is used in 2000° to 2600°F applications.

# How to Organize a Distribution Cost Analysis Program

By T. J. McGann, Consultant, New Rochelle, N.Y.

**Distribution cost analysis can cut down hidden marketing costs.**

**But getting a program started entails some organizational problems.**

**Here is a rundown of some of the factors to consider.**

■ Distribution cost analysis is a relatively new management tool. But it's gaining faster acceptance because of the way it gathers data on marketing costs to guide management decisions.

Distribution cost analysis assembles costs by functions.

All operating costs are channeled into functional cost centers such as delivery, order processing and inventory charges. Each functional cost can then be allocated to products, customers, and territories.

This makes it possible for management to review marketing policies in terms of cost and income.

**Helpful Results**—Since it pinpoints both profits and losses, distribution cost analysis can be brought to bear on such marketing problems as pricing, order-size profitability and distribution channels.

The profit and loss statements prepared by product lines, customer groups or territories are the most helpful results of a distribution cost analysis.

These profitability statements are useful in any number of ways. They can determine the profitability of products and product lines, sales territories, customers and industry groups.

In addition, they show how volume changes affect net profits and permit the setting up of marketing cost standards.

**Need Full Support**—But a distribution cost analysis program may bring you into many untested areas of data gathering. Therefore, it calls for the full support of those who will gather and use the data.

This may bring about some organizational problems. However, many of them can be worked out in advance. One of the first things to do is to decide on the types of information needed and then meet with those who will be responsible for their development and application.

Here are the most common organizational problems you may run into in setting up a distribution cost analysis program:

## Distribution Cost Analysis

Part 2 of a Series

**NEXT WEEK: Putting the Results to Work**

Analysis is the payoff in a distribution cost program. Next week Mr. McGann tells what the figures mean and how they can be applied.

In last week's issue he outlined the overall benefits of a distribution cost analysis program.

### 1. Marketers and Accountants

Unfortunately, this relationship has never been too fruitful.

Marketing people have not told accountants of their need for marketing cost data in a clear and convincing manner. It may be that they don't have a clear-cut picture of distribution cost analysis as it applies to their companies.

But if a distribution cost analysis program is going to work there must be a healthy accountant-marketer relationship. It can best be obtained by spelling out the duties and responsibilities of both groups involved in the program.

It's up to the marketing people to state what marketing cost data they need. It's up to the accountants to furnish such information. And it's top management's job to coordinate their efforts and approve program expenses.

### 2. Cost Committees

A distribution cost analysis program involves more than marketing people and accountants.

To gather the data, help may be needed from the office manager, personnel director, warehouse superintendent, market research director and sales manager.

It's necessary, then, to set up a cost committee made up of all those who will supply and use the data.

### 3. Cost Allocation

Cost allocation is the most controversial feature of a distribution cost analysis program. Allocation bases must produce charges which

are accurate and yet economical to apply.

When factory cost accounting was first employed, cost allocation was also controversial. However, with time and attention, factory costing procedures became more refined. Today their results are accepted without question.

The cost committee can be very helpful in this area. Its work on this phase of the program gives them a sound footing in it, leads to quicker acceptance of cost figures, and develops a greater cost-consciousness.

#### 4. Accounting System

The design of the accounting system used in a distribution cost analysis program belongs to the accounting department.

However, there are other problems here which usually will involve top management. There's the question of whether the distribution cost system will replace the current accounting or supplement it. Common accounting systems are based on natural expenses, i.e., rent, wages, depreciation. The system used in distribution cost analysis is based on functional costs, i.e., order processing and material handling.

**Compare Records**—If a subsidiary company embarks on a distribution cost analysis program, its principal books of record must follow the parent so that consolidated statements can be made.

If a company is independent it may want to keep both sets of records for a year to obtain a comparison—then decide whether to continue both or keep only the functional set of records.

Any company which plans to use only a functional set of records should first make sure it conforms with the regulations of the Internal Revenue Service.

**Keep It Up**—Decisions must also be reached on the permanency of a distribution cost analysis program. Whether it's done spasmodically or continually will affect the type of records, the personnel and even the quality of the work.

If a company's marketing costs

## What Two Companies Gained

### Company A—Product Improvement

This company had a total of 90 different lines. Its net profit in a recent period came to \$700,000—about 4 pct of sales.

A statement of product line profitability, however, showed that 50 of the 90 lines contributed a net profit of \$1.3 million. The other

40 lines sustained \$600,000 in losses.

The company is now exerting every effort to bring these loss lines into a profit. If successful it will add at least \$600,000 to its net profits—at a cost of \$15,000 for a distribution cost analysis.

### Company B—Cost Reductions

Another company had marketing costs of \$1.2 million.

When compared to standards developed under a distribution cost analysis program, its cost pattern was found to be \$500,000 over

what it should be.

The company is now launching an all-out drive on marketing costs which should add substantially to its net profits.

are substantial, the program should be permanent.

The most important measurements, such as territorial or product profitability, should be made regularly. The data needed for these statements should flow in routine fashion.

#### 5. Personnel Needs

The number of people needed to operate a distribution cost analysis program depends, of course, on the amount of work required.

In a large company it may call for two or three more. A medium-sized company may need only one and a small company perhaps none at all.

But if more people are necessary, one should be an accountant qualified in cost work. Others may be comptometer operators since most of the work is tabular in nature.

#### 6. Selling the Program

A distribution cost analysis program must be sold to top management, marketing management and financial management.

Usually, there's little difficulty

selling marketing management since it furthers marketing objectives.

But top management must be sold on the overall benefits of the program. It will want to know that any net profits increases of the program will not be offset by higher accounting costs.

**Make Sound Estimates**—Therefore, in selling the program it's important to make realistic estimates of net profit improvements and the cost of achieving them.

Financial management must be sold on the fact that any additional work thrown on the accounting department will be put to good use. All too often accounting staffs have worked hard to produce figures which are never used.

Accountants are not going to be interested in more work as such. But they will be very interested if they feel it will be productive and bring them close to management.

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# Money Woes Slow Road Plans

**Just when it looked as though the U.S. highway program would shift into high gear, the budget was cut.**

**Now the Government plans to say how fast the money can be spent.—By G. J. McManus.**

▪ Roadbuilders are still trying to get their bearings after two severe setbacks.

Heading into what was supposed to be a period of all-out construction, road men learned last spring that Federal funds for fiscal 1960 had been slashed by \$400 million

from 1959 year and by \$700 million from the first estimate.

Now, builders have received news that highway dollars would henceforth be doled out under strict Federal schedules.

**Applying the Brakes**—Immediate effect of these moves was to bring new road projects to a screeching stop. In the first half of 1959, highway contracts ran well ahead of last year. This trend was reversed in July when job placement dropped nearly 30 pct under the same 1958 month. Total for the year is now running behind 1958.

For the long pull, spending cut-

backs mean road building will decline over the next two years. This means completion of the Federal interstate program will probably be pushed back by a good two years.

**Idling Speed**—For suppliers of equipment and materials, new fiscal plans add up to another letdown. Steel mills estimate the dollar shortage will knock 500,000 tons off 1960 shipments. Estimates for 1961 are being revised downward by about 1 million tons.

Makers of construction equipment face uncertain prospects in the middle of what seemed a solid uptrend. State highway departments must now mark time after a long struggle to build up engineering staffs for expanded workloads.

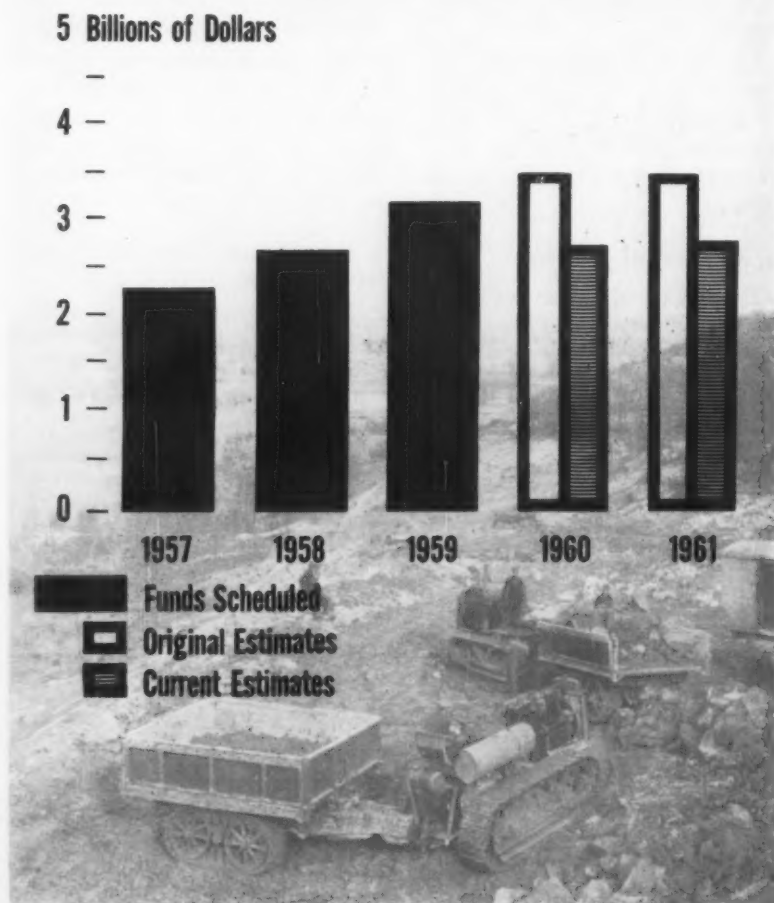
**Suppliers' Problems**—The problem of suppliers was summed up for *THE IRON AGE* by General Louis W. Prentiss, executive vice president, American Road Builders Assn. Explaining that cutbacks came after everyone had expanded in hopes of a larger program, General Prentiss offered this thought:

"The only way industry can support the highway effort efficiently and effectively is to have assurance of a long range, soundly financed program."

**Stalled in Gear**—The current reversal is doubly disappointing because it hit just as highway building seemed to have passed out of a long period of delay and frustration. The Federal program broke with a splash in 1956. It was to add 41,000 miles of interstate highway and form the heart of a \$100 billion push. Many wondered if there would be enough steel and equipment to meet building needs.

Makers of construction machinery immediately began gearing up to the job. Despite warnings that it takes 22 months to go from financing to actual digging, equipment stocks were built up.

## Federal Highways Hit Roadblock



**Opening the Throttle**—A good part of this fleet remained in mothballs during 1957 when only 150 miles were added to the interstate system and total roadbuilding increased only 3 pct.

Last year the program began gaining speed and a slump-minded government pumped extra dollars into schedules. Setting aside the pay-as-you-go provisions of the original act, Congress boosted highway funds for fiscal 1959 to \$3.1 billion. Plans called for spending \$3.4 billion in fiscal 1960.

**Shift Into High**—This year, building moved into high gear. Over the first eight months, highway construction showed a 19 pct increase over 1958. Shipments of construction equipment jumped 40 pct in the first quarter and another 37 pct in the second quarter. New roads brought the interstate total to 4300 miles and the state system to 72,000 miles.

At the same time, the program was rapidly going in the red and the recovery was changing the Government mood from one of pump priming to economy. President Eisenhower reinstated the pay-as-you-go provision of the highway act. He proposed new gasoline taxes.

**Pay As You Go**—Congress cut the tax bite requested from 1.5¢ to 1¢. Effective date was pushed back from July 1 to Oct. 1. Beginning in 1961, part of the taxes on autos and motor parts will go to Federal roads.

Returns from these measures could ease financial restrictions on highways more than anticipated. Moreover, other relief measures are being considered. But as it now stands, the interstate allocation for 1960 is \$1.8 billion, or \$700 million less than the \$2.5 billion originally slated. Federal funds for state roads have been cut by \$25 million.

**Speed Limit**—In addition, the states have been directed to follow definite schedules in obligating federal cash. In six months ending Dec. 1959, the states may spend only 33 pct of the total allotment.

# Tool and Die Market Stays in Good Shape

**Tool and diemakers are enjoying a healthy market despite the steel strike.**

**Foresight and good warehouse relations have kept them in needed steel.**

■ To their own surprise, tool and diemakers continue to enjoy robust business despite the steel strike. Foresight and good warehouse relations have kept steel supplies ample. Customers continue to buy tooling. In some cases even when their own plants are closed for lack of metal.

Interviewed at the annual meeting of National Tool & Die Manufacturers, Assn. in New York last week, toolmakers from all parts of the country told the IRON AGE orders are satisfactorily high.

**Market Strength**—Demand comes from virtually all areas of industry with predictable strong points—automotive electronics, and rockets, missiles and military hardware. For many shops, present backlogs are a pleasant change from the tooling slump that started in 1958. (The IRON AGE, Nov. 5, 1959, P. 54.)

Overall, steel shortages are seldom a direct problem. Strike hedging in tool steels is relatively easy. A full year's supply for even a large die shop is still a comparatively small quantity. Toolmakers stocked up well in advance of the strike deadline, as did steel service centers, major tool steel source. Imports of tool steels are nothing new. Tooling producers continue to use substantial amounts of the foreign product. Since their relations with importers are longstanding, they escape many of the headaches connected with foreign steel. In addition,

many of the mills still operating are tool steel producers.

The strike has not been without its effects on tool shops, however. Spot shortages, while not serious so far, are a nuisance to many shops. More serious are steel shortages at customers' plants. These cut two ways: First, many tooling shops do precision machining and stamping on customers' steel. And this business is off as customers run short of metal.

Second effect is indirect, but perhaps more harmful in the long run. Some customers, forced to curtail their own operations through lack of steel, tell suppliers to hold up deliveries. And in some cases contracts are cancelled outright. This in itself is bad enough. But tool shops fear that economic aftermath of the strike may cause some projects and expansions to be cancelled or postponed.

**Buyer's Plans**—Happily, such cases are the minority. Most tooling buyers, especially the larger firms, continue to plan ahead and buy tools and dies even when their own operations are halted.

Tool makers are generally relaxed about possible higher steel prices. They point out that steel is such a small part of the cost of their product that metal price is relatively insignificant. But they fear a wage boost in steel. Inevitably, they stress, this would spread and boost their own labor costs, already among the highest in industry.

**Looking Ahead**—But because the tool and die industry is one of feast or famine, the NTDMA is planning ahead. It hopes to hold management education seminars to assist shop managers to keep things going when business slumps.

# Youngstown Plans Expansion

■ More than \$60 million will be spent by Youngstown Sheet and Tube Co. on five major expansion projects at its Indiana Harbor Works, East Chicago, Ind.

J. L. Mauthe, board chairman, said work on the program will begin right after steel mills resume production. Major contracts for buildings and equipment have been placed.

**Five Areas**—The projects: A 52-in. six-stand tandem cold reducing mill for making tinplate for tin cans, a continuous galvanizing line, an 87-oven coke battery, a 300-ft extension of the ore dock and additional equipment for fin-

ishing seamless tubing.

Completion of the galvanizing line and the six-stand mill is slated 15-18 months after work is begun. This will put Youngstown into the galvanized sheet market for the first time. The other projects will be finished earlier.

**The Products**—The six-stand mill will deliver coils up to 46 in. wide and 80 in. in diameter. They will weigh more than 62,000 lb. The mill will be driven by a Westinghouse power drive delivering 34,900 hp.

The new hot-dip galvanizing line is designed to produce coil and cut

sheets, delivering the coated product at the rate of 400 fpm. Finished materials will be in thicknesses ranging from 14 to 30 gage.

New coke ovens will have a daily coking capacity of 1450 tons.

**Part of Plan**—New equipment will include additional threading machines, a hydraulic tester, a weighing, measuring and stencil machine and a coupling and screw-up machine.

Mr. Mauthe says the program is in line with Youngstown's long-range plans to become increasingly competitive in the Chicago market and to widen its product line.

## Hearings Slated On Steel Prices

Sen. Estes Kefauver's Senate anti-trust subcommittee will not investigate the steel strike. But it will open a new probe of the steel in-

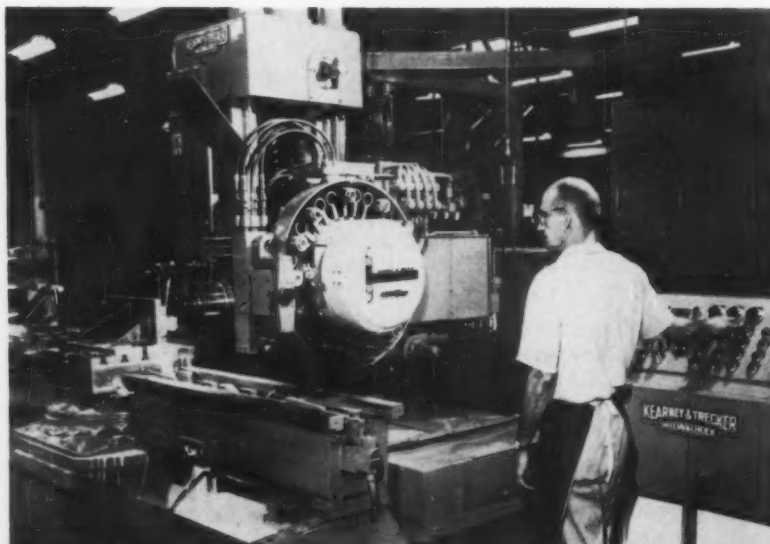
dustry if the eventual settlement brings increases in steel prices.

Sen. Kefauver's subcommittee apparently got pushed out of the steel strike investigation race by pressure from Sen. John Kennedy's Senate Labor subcommittee. The antitrust

unit started to rush into motion immediately after Kaiser Steel settled, but then quickly called a halt.

Now, spokesmen for the anti-trust subcommittee say they will "scrupulously avoid infringing" on the business of the labor subcommittee. Sen. Kennedy, D., Mass., announced that his group will hold hearings beginning late this year or early next year on the labor-management aspects of the steel deadlock.

## First Run Is Successful



**MILWAUKEE-MATIC:** First production runs of the numerically-controlled Milwaukee-Matic combination milling, drilling and boring machine have proved successful at Boeing Airplane's Wichita plant. The machine will be used in making small missile components.

## ASM Will Operate Searching Service

A new, electronic metallurgical searching service will be started early in 1960 by the American Society of Metals.

The service, known as the ASM Metals Documentation Service, will have 100,000 titles-per-hour capacity.

Allan Ray Putnam, managing director, ASM, says it will save thousands of dollars for firms.

The project will give subscribers titles and information about documents in any phase of metallurgical science, engineering and the fabrication and use of metal parts appearing in print.



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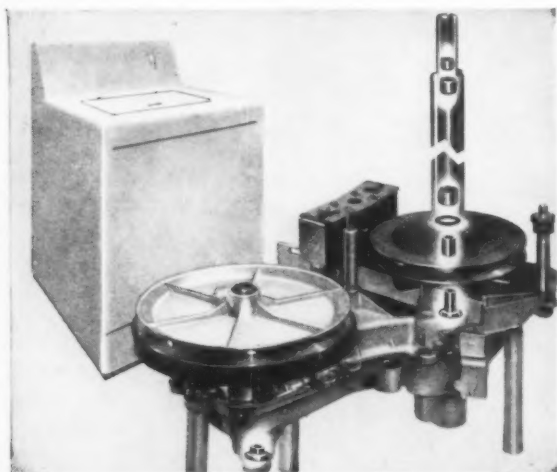
**SUPERIOR STEEL DIVISION**

OF  
**COPPERWELD STEEL COMPANY**  
**CARNEGIE, PENNSYLVANIA**

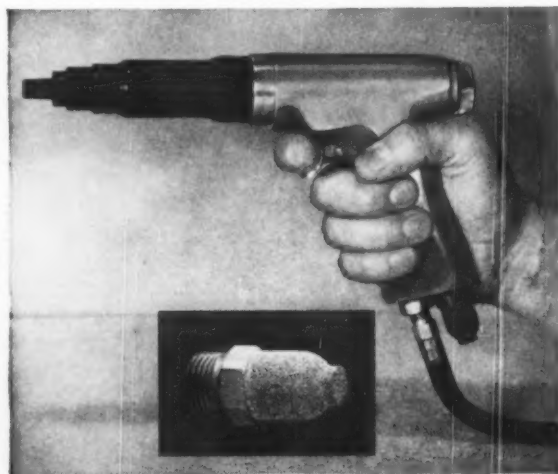
For Export: Copperweld Steel International Company, New York

Wheel covers illustrated manufactured by Lyon, Inc.,  
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# BOOST PRODUCT APPEAL with **OILITE**



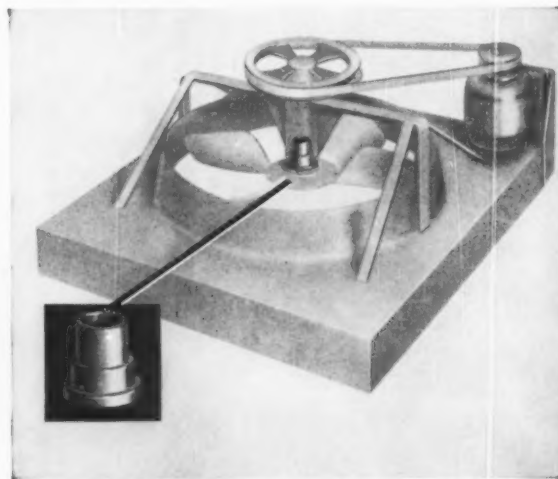
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R. David Thomas, Jr.

# Welding's All-Around Man

R. David Thomas, Jr., hardly had time to get his research department under way when war-time needs called for a new welding technique.

He found one, and has since continued to be a leader in the welding industry.

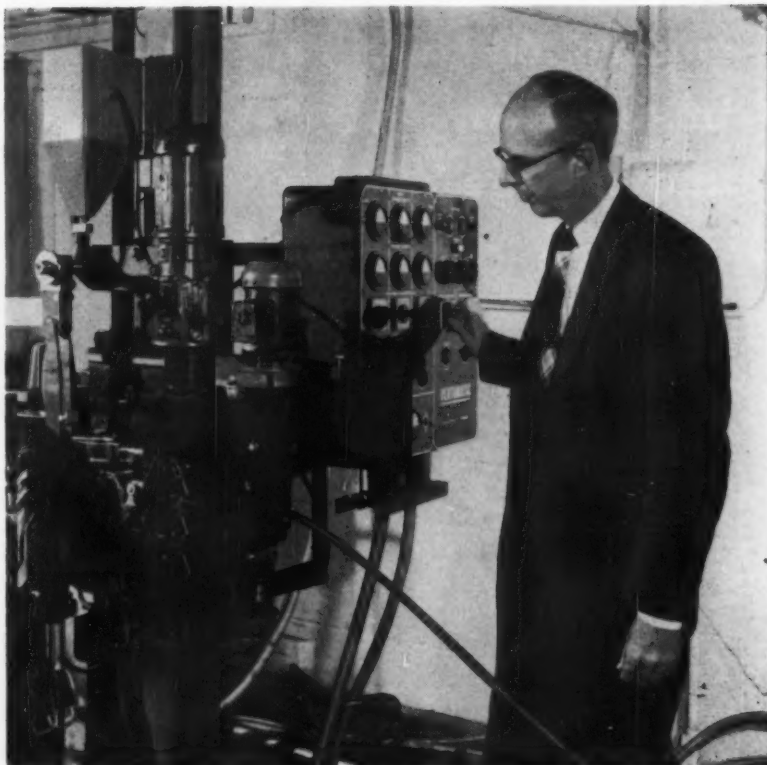
■ Soon after his graduation from Cornell in 1938, R. David Thomas, Jr. set about organizing the research activities of Arcos Corp., Philadelphia.

His department had little time to get its feet off the ground before World War II broke out. Nickel became scarce. Mr. Thomas and Arcos began searching to find an electrode for welding armor plate that would contain reduced amounts of the metal. His research set the course for a new line of low-alloy, high-strength electrodes. These electrodes became an important tool in defense plants.

**Used Today**—Today they are widely used in welding earth moving equipment, railroad cars, trucks, bridges and naval vessels, made of low-alloy, high-strength metals.

Mr. Thomas' welding know-how also led to service on numerous government and industry advisory bodies. He served with the Joint Navy-NEMA Committee charged with developing low hydrogen ferritic electrodes. He was also active with the Ordnance Advisory Committee for welding armor plate and the National Research Council Committee on Welding.

**Succeeds Father**—In 1956 Mr. Thomas became president of Arcos. He succeeded his father, who began the firm in the early 1930's.



R. DAVID THOMAS, JR.: He filled a critical wartime need.

After assuming the presidency, Mr. Thomas continued to be active in the affairs of the welding industry.

Currently he is a member of the Atomic Energy Commission Welding Committee, the Welding Research Council's High Alloy Committee, and the Arc Welding Section of the National Electrical Manufacturers Assn.

He is also a leading member of the American Welding Society. While serving with the Philadelphia section, he was secretary, vice chairman and chairman successively during 1954 and 1955.

**Award Recipient** — In national activities of the society, he was presented the AWS Samuel Wylie Mil-

ler Award in 1958. The award was made in recognition of his many contributions to the techniques for welding stainless and low-alloy steels. Mr. Thomas was elected second vice president of the society in 1958, and first vice president last June.

He has taught metallurgy and welding courses at Temple University and Drexel Institute of Technology. He also started an evening course in welding at Drexel to meet growing welding needs in the Philadelphia area.

**Author and Speaker**—He is the author of several technical articles and papers on welding and is an international speaker on the subject.

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# Take Close Look at 1960 Plans

**Effects of the long steel shut-down have thrown the business cycle off schedule.**

**If demand stays strong, the boom may now last longer than expected.**

■ It may be time to revise your plans for 1960. The steel strike and its effects have pushed back the economic cycle.

Before the strike, the present boom was scheduled to last through next year. Many economists looked for a peak in business about mid-way through 1960. There was some concern activity might taper off after that. And even more doubts about early 1961.

Capital goods makers, for example, expected billings to hold up all during '60. But some wondered if new orders would level out or taper off in the third quarter.

**Changing Schedule**—Now the long strike and strike-caused shut-downs have changed the timetable. And the change will have an important effect on sales and production plans for next year.

The strike has probably postponed, but not blunted the recovery. When steel supplies permit, production will return to high gear. But, even then, automakers and other manufacturers will need time to rebuild inventories.

**Spending Revival**—As production steps up, consumers who postponed spending plans will feel more like buying. Capital spending plans delayed by the strike will get the go-ahead.

There is, as yet, little evidence the boom has lost its bounce. Most of the turndown has come from a

lack of supply, not demand.

End-product demand actually increased during the strike-torn third quarter. While business inventories were falling, demand kept rising. Total personal spending, government spending, and business investment (excluding inventories) were higher than in any quarter this year or last.

**Holding Action**—Also encouraging is the way the economy has held up during the long steel strike. Industrial production in September

was still within 5 pct of June.

Personal income fell only 1 pct from its June record. Retail sales dropped only 3 pct between July and September.

The important thing to keep in mind, however, is the change in timing when the boom resumes. After the first upsurge, a more gradual advance is expected. There probably won't be any sharp peaks, but a steady rate of advance. After the labor picture clears, the boom may continue for a longer period of time—at a less feverish pace.

## Avoid Straight Line Planning

■ Almost every business trend has its peaks and valleys. These ups and downs can cause a lot of trouble if your forecasting is based on a straight line projection.

**Few Straight Lines**—At least that's the opinion of Frank P. Minnelli, Director of Planning, Yale & Towne Mfg. Co. "We find very few straight lines in today's economy," says Mr. Minnelli. "Any index we check consists of curves, peaks, and valleys, often recurring in cycles."

"Because of this, the value of the straight line projection is limited from the point of accurately planning corporate growth over a period of years."

**Only Correct Twice**—In any business cycle, he points out, a straight line projection is usually correct at only two points. These are when the cycle is on the rise and crosses the line. And again when the declining cycle re-crosses it later on. During the period in between, the

straight line is either too high or too low.

Mr. Minnelli notes that, since 1945, the nation has had economic cycles of four years each. He suggests: "Chart your net bookings, new orders, shipments, and backlog over a period of years."

"If there's evidence that regular trends exist for your company, use them as a guide."

## Inventories Shrank In September

Inventories declined again in September, the Dept. of Commerce reports. The reduction during the month was \$350 million, continuing the trend begun in August.

The decline was centered in manufacturing. Heaviest drop was among the fabricated metal, automotive, and transportation equipment industries.

Total stocks in retail and wholesale areas were unchanged.



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# Rambler Takes the Hurdles

## Even the Steel Strike Hasn't Hurt Production

**With the Rambler as his ace, George Romney led American Motors out of the financial woods in just five years.**

**Here are some of his latest projects and predictions. — By A. E. Fleming.**

■ The Rambler keeps rambling along, and where it will stop nobody knows. Except maybe American Motors president George Romney.

Today, in the midst of the worst steel strike in history, Rambler plant in Kenosha, Wis., is running six days a week at record levels. Sales are at an all-time high. Now in sixth place in the 1959 new car sales derby, the compact Rambler has its lamps aimed high beam on Oldsmobile's No. 5 spot.

**Speed Up**—And now, almost as an answer to the Big Three small cars, Mr. Romney declares he must relieve his company's growing pains. To rush expansion of Rambler output, AM will chip a year off its timetable by converting the big Simmons steel furniture plant in Kenosha, Wis., for Rambler body building. The move will boost body production 35 pct, from a current capacity of 1900 units a day to over 2500.

Mr. Romney calls it a short cut to meet rising Rambler demand that has been further stimulated by the Corvair, Falcon and Valiant.

The leasing deal for Simmons was okayed Nov. 3 with the Kenosha Harbor Development Corp., which recently bought the two-million-sq-ft factory from Simmons. Simmons employment in Kenosha is about 1100.

**How Much**—Getting the plant ready for Rambler will take seven months and cost \$14.5 million. The move precedes, but doesn't replace, other Rambler growth plans. "We're already well into our \$17.5 million six-cylinder engine, axle and machining expansion in Kenosha," reports Mr. Romney. "We're continuing to advance our study of a possible further expansion program at the Milwaukee body plant."

AM's beef-up began in the spring of 1958 when annual capacity was 250,000 units. This was inflated to 300,000 at the start of 1959

model in August 1958. It was pumped up again to 440,000 near the end of the 1959 model year.

Capacity is now just over 500,000. The new body works is part of a plan to push Rambler output well above the 600,000 level during the last half of 1960.

**Careful Spending**—Every increase, says Mr. Romney, has been made with modest capital spending. Total plant investment per car has been kept well below other auto firms. AM expects to pay for this one out of company earnings.

In the 1959 model year, AM

## Aluminum Bids for Mufflers



**BEST IN TEST:** The muffler in the center is a new aluminum muffler after it, and the standard ones, were road tested. L. W. Wickson (l.) president, Centr-O-Cast and Engineering Co. of Detroit, and J. Donald Shircliff, automotive sales manager, Reynolds Metals Co. believe their development will outlast autos of today—and tomorrow.

spent \$10.5 million on internal expansion. Body capacity in Milwaukee was padded with new welding equipment, longer trim lines and bigger paint facilities. At Kenosha, engine capacity was enlarged, and machining operations augmented. The \$17.5 million new being spent at Kenosha will hike six-cylinder output by 33 pct during the 1960 model year. The six-cylinder expansion includes a new engine block line and more machining operations for such as crankshafts, camshafts, cylinder heads, rear axles and front suspension. Daily capacity will climb from 1650 to 2200 engines.

**Better Efficiency**—"The first effect of increased engine capacity," says Mr. Romney, "will be to give us a sounder, more flexible and more efficient engine production operation with less pressure than is being exerted in our present three-shift engine operation."

Today, Rambler's main plant in Kenosha turns out more cars than any other single plant in the country. AM is still adding to its record

payrolls in both Kenosha and Milwaukee. More than 1000 workers joined the two plants in late October, swelling employment to a new peak of more than 22,800. A year ago the figure was 14,600. In round numbers, Kenosha employs 12,700, Milwaukee body plant 9700, and Milwaukee parts plant 440.

**One Basket**—Why is AM putting all its production eggs into one basket. Why doesn't it spread to other states? Because Mr. Romney believes in making cars in a single set of plants.

He points out that 10 years ago there was some advantage in widespread car assembly points, mostly because of freight cost saving. But a recent AM study shows there are now drawbacks in decentralized operations, largely the higher freight costs on automotive parts and sub-assemblies and relatively lower costs on truck shipment of completed vehicles. Repair expenses in a decentralized system also are said to be greater.

Mr. Romney and his company have come a long way in a short

time. Five years ago Nash and Hudson merged to form a tottering corporation \$90 million in debt. The debt is erased and profits are gushing in. And in 1959, 374,000 Ramblers were turned out, the greatest volume ever reached by an independent in a model year.

**What's Ahead**—How far is the dedicated Mr. Romney going to take American Motors? What is his timetable?

He says by 1965, 60 pct of total new car sales in the U. S. will be smaller cars. Of this 60 pct, he says AM will account for 25 pct, more than any other company.

You can arrive at some interesting conclusions with a bit of mathematics. Experts say seven million car sales annually will be normal in the 1960s. If 1965 is a seven million year, 4.2 million compact cars will be sold according to Mr. Romney. American Motors' projected share—25 pct—comes to 1,050,000 Ramblers. From this you might say Mr. Romney expects Rambler to be battling Chevrolet and Ford almost sale for sale in another five years. Perhaps.

But more significantly, slightly over a million cars is exactly what Chrysler Corp. sold in the last seven million car year, 1955. It could be Mr. Romney expects to steer American Motors into one of Big Three positions.

## Canada Automakers Hit By U. S. Steel Strike

The United States steel strike is affecting Canada's automotive industry. Shortage of steel from the U. S., has forced General Motors Corp., to suspend production at its Oshawa, Ont., plant.

Layoffs have started, and by the end of next week some 7000 workers will be out. Several other plants of General Motors in Ontario also face suspension of operations.

The general steel situation in Canada is not critical. Canadian mills are producing close to capacity.

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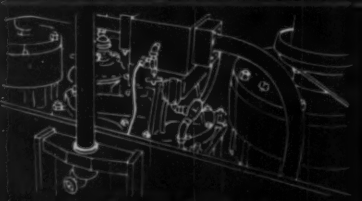
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# Ike to Call for Spending Cuts

**President Eisenhower will propose cuts in government spending next January.**

**Major areas to be cut will be national defense and foreign aid.—By G. H. Baker.**

■ Some real cuts in government spending will be proposed by the Administration in January.

The White House is making it clear that President Eisenhower is deeply disturbed by the continued surging of government costs.

Mr. Eisenhower believes the nation must husband its fiscal resources as carefully as it manages its national defense efforts.

**Folly Unwanted**—To tolerate financial weakness would be folly equal to calling a halt to defense spending, he believes.

The cuts Mr. Eisenhower will recommend to Congress early next year will include trimming the defense budget by about \$500,000 (from the current rate of \$41 billion), and striking out about \$750,000 in foreign aid.

**Military Protests**—Military leaders are protesting the proposed cuts hotly. They contend their annual budgets must rise steadily over the years to permit them to keep up-to-date arsenals. To hold military spending is equal to cutting it back, they say. The higher cost of modern weapons, and inflation, require running faster just to hold our places relative to the USSR military program.

As for cuts in foreign aid, Mr. Eisenhower believes the existing rate of handouts (about \$3.2 billion a year) can be cut to about \$2.5 billion. Why? Western Europe is enjoying unprecedented prosperity, and U. S. gold reserves going abroad

in large amounts, showing our unfavorable balance of trade.

## Red China Trade Talks Reopened

A resumption of trade between the United States and Red China is under discussion again.

Such a move is being urged by Soviet Premier Khrushchev and other leaders in the USSR and China. The Administration has refused to permit trade with China or to extend any official recognition of its Communist government.

But there are signs this position is softening. The Senate Foreign Relations Committee recently published a report urging opening of a graduated "negotiation" between the U. S. and China.

**Ultimate Goal**—Such "negotiation" would have as its ultimate goal the extension by the United States of diplomatic recognition to Red China, the renunciation of the Chinese Nationalist Government and reopening of U. S.-China trade.

Basic philosophy of the new Senate report is that: 1. The Communist government of China is permanent. 2. Ultimately, we must recognize this fact, so why not start now to deal with this government?

The Senate report makes no allowance for the possibility that the present government may be replaced by another regime or by a form of nationalist Communism (without ties to Moscow); such as exists in Yugoslavia.

The committee has omitted overt endorsement of the report, saying it is only a "study" by "experts."

## IRS to Look at "Big Spenders"

■ The Internal Revenue Service is cracking down on fake tax deductions for "travel" and "entertainment."

New accounting and tabulating equipment at IRS offices make it easier to spot chiselers. IRS says it feels a need to ferret out false deductions because public resentment against padded expense accounts is rising.

**Serious Concern**—IRS Commissioner Dana Latham says he is concerned over abuses in travel and entertainment deductions.

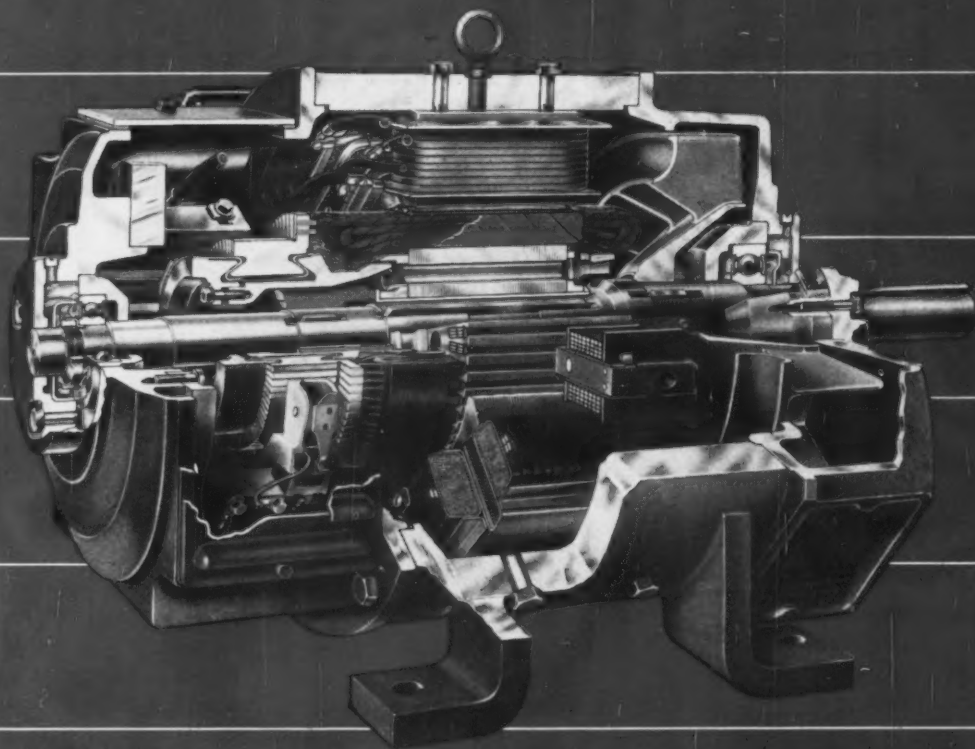
Specifically, he names: Purported business trips, including conventions, which are vacations at resort hotels, lodges, or other spots; entertainment that is personal rather than business in nature; ownership and operation of cars, yachts,

planes, hunting lodges, beach homes, etc. for personal use by company officials; purchase, with company funds, of goods destined for personal use of businessmen, their families or friends.

**Angry Public**—Public resentment of these practices is mounting," Mr. Latham declared. "This resentment will express itself in drastic legislation if this situation is not corrected."

Mr. Latham points out that a bill pending in the Senate would stop the deduction of any expenses paid for entertainment, yachts, vacation houses or lodges, gifts, dues or initiation fees and traveling expenses to conventions outside the U. S.

Cheating businessmen will aid this bill, he says.



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# How Kaiser Pact Affects West

## Settlement Restores 29 Pct of West's Output

**Kaiser Steel agreement with USWA means Farwest consumers will get supplies faster than rest of the U. S.**

**Industry retaliation against Kaiser is discounted by Tom Campbell, IRON AGE Editor-in-Chief.—By R. R. Kay.**

■ Steel users on the West Coast will get material a lot sooner than the rest of the country.

The Kaiser Steel settlement with the United Steelworkers means some Farwest manufacturers' supply lines will soon start filling up. The steel is going to look good, especially to companies with empty storage bins.

**Big in the West**—Tom Campbell, Editor-in-Chief of The IRON AGE, recently spoke before the Western Reinforcing Steel Fabricators Assn. He pointed out that although Kaiser's production is only 2 pct of U. S. output, it's a huge 29 pct of the Farwest's.

Mr. Campbell pooh-poohed talk of a so-called retaliation against Kaiser by the rest of the industry. "Pure speculation," he said. "It really has no relation to actual business conditions."

**Full Knowledge** — About the separate pact, Mr. Campbell said the other 11 companies knew all along Kaiser was in a position to have private talks with the union. And they understood they'd be kept advised.

IRON AGE's Editor-in-Chief told the WRSFA that much ado has been made of the Kaiser settlement. But the plain facts are these:

The Kaiser family controls its company. Large eastern companies must answer to hundreds of thousands of stockholders.

Kaiser Steel has to deal with stockholders, too. But its responsibility is much different than most of the other 11 companies.

And it has a different outlook on industrial relations, union relations, and about pricing policies.

### Defense Job Pool

How can small companies get into defense business? Here's how

a Los Angeles group is trying to do it.

Eleven small firms got together to form a defense production pool called Unified Industries, Inc.

Aim: To get contracts too large for any of the group alone.

R. W. Flint, its director, says, "There are a lot of black boxes in missiles and ground support which are too small for the large contractor to handle and too big for the small firm."

Mr. Flint says his group has the facilities and know-how to take care of such business.

## This Is Blend of Jeep and Helicopter



**AERIAL PLATFORM:** Vertical take-off and landing aircraft (VTOL) combines features of a jeep and a helicopter. It was developed by Santa Barbara Div., Curtis-Wright Corp., for the U. S. Army.

# 5 Basic Reasons why MARVEL HACK SAWS CUT-OFF MORE ACCURATELY...

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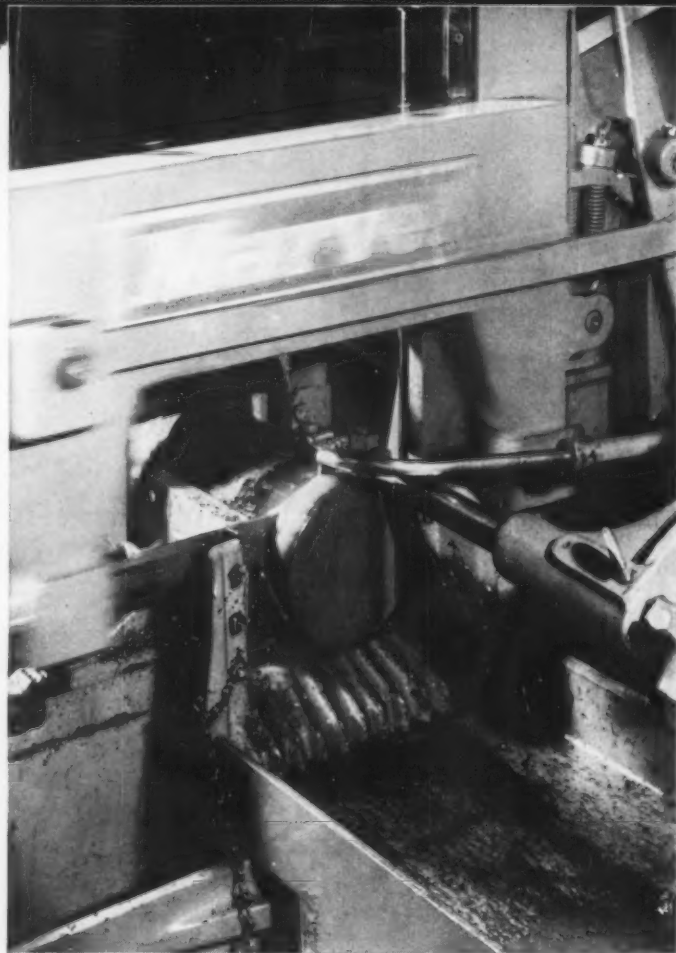
Anti-friction ball or roller bearings are used at all load carrying points. Even the strongly braced saw frame reciprocates on heavy duty, fully enclosed preloaded ball bearings which provide permanent, frictionless rigidity and true-running, straight line cutting strokes.

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## 4. Positive Relief Blade Lift

On the return stroke, positive relief lift raises the blade to provide proper and "cushioned" lead-in on the next cutting stroke. This prolongs blade sharpness, life and accuracy.



## 5. Rigid Cutting Tool

Cutting-off accuracy requires a rigidly held, relatively short cutting tool. MARVEL Unbreakable High-Speed-Edge Hack Saw Blades, which combine a narrow high speed steel cutting edge permanently welded to a tough alloy steel body, can be tensioned from 200% to 300% more taut than ordinary blades. This provides a most rigid cutting edge.

Catalog C 85 has complete details, facts and figures on both Marvel metal cutting Hack Saws and Band Saws. Write for it today.



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# Strike Clouds Tool Order Picture

## Backlogs High, But Some Buyers Will Defer Programs

**Latest figures show machine tool orders and backlogs are at their high point for the year.**

**But there are indications that the steel strike has caused some customers to change their buying plans.—By R. H. Eshelman.**

■ Overall figures on machine tool orders and backlogs just issued by the National Machine Tool Builders Association show steady increases for the first nine months this year.

Sales data on presses and other metalforming equipment doesn't look as good as metal cutting machine tools. But in general the trend is upward. Backlogs have apparently built up to the highest point this year.

But this is the rosy view. Big question mark at this time is when and how will effects of the steel strike hit the machine tool industry? How will the strike alter future manufacturing plans?

**Ford's Optimistic**—A Ford Motor Co. spokesman sounds an optimistic note. He asserts that the strike is making no changes in placement of orders for tools and equipment for '61 model year.

Others are less encouraging. There are spotty reports of a slowdown of cutting tool orders, hold-ups on estimates and bids, and a slowdown in placement of orders for machines and equipment. One observer questions if actual shipments of machine tools in 1959 will exceed last year.

**No Metal Pinch**—Although most machine tool firms apparently have yet to feel any real pinch on materials, it looks like trouble ahead.

Some builders expect temporary difficulties securing adequate supplies of plate for weldments. And some special alloys may be hard to locate. But expect the big pinch on the industry to be in new orders.

**Belt Tightening**—"It's just a matter of economics," one source explains. "The laid-off worker tightens his belt and forgets about the new refrigerator for a while."

He notes that industry is losing production and income at a staggering rate and will continue to do so over the next several months. "We're in much the same situation as the worker," he continues. "So tools and equipment we had

planned to buy through the first 6 months of 1960 will no doubt be deferred."

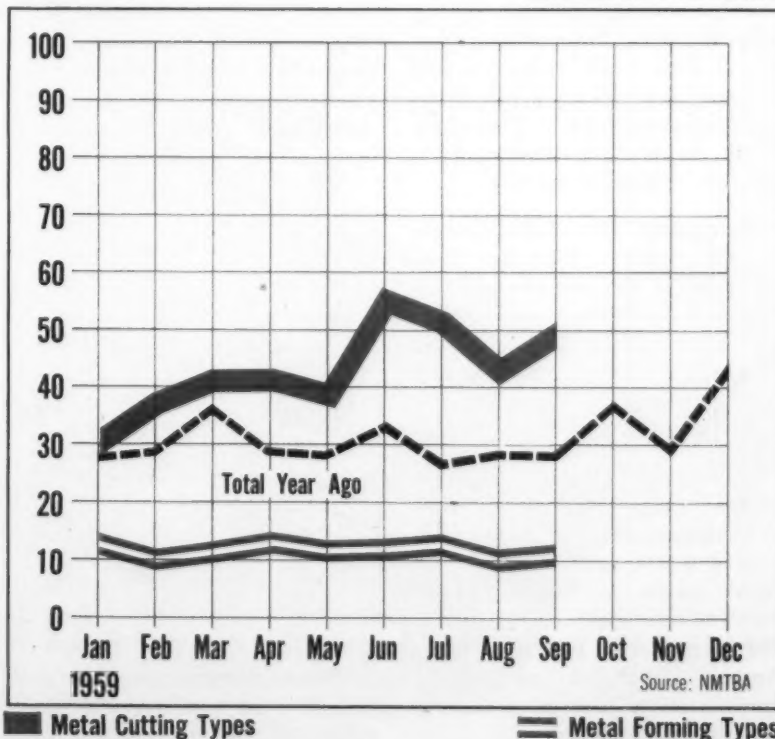
**Plus and Minus**—Indications are that many plants will try to get along with what they have. This stretchout may last for one or two years, until companies are able to replace capital equipment that manufacturing managers already had slated to go.

One bright spot in this picture may be government replacements. Reports are current that a realistic formula may be applied to government owned tools to determine obsolescence. This could mean more orders from this source.

## MACHINE TOOLS-NET NEW ORDERS

In Millions of Dollars

Metal Cutting and Forming Types



## INDUSTRIAL BRIEFS

**Under Way**—Firth Sterling, Inc., began operations, Nov. 2, of separate and complete tungsten carbide sintering facilities, at its McKeesport plant to serve the Pittsburgh area. Similar facilities have been established at Hartford, Detroit, Houston and Los Angeles.

**Nuclear Expansion** — Westinghouse Electric Corp., is expanding its nuclear core manufacturing laboratories at Cheswick, Pa. The laboratories will provide additional development and production facilities for nuclear fuel elements and core components. They will house a newly formed group—the Nuclear Components Development Laboratory.

**Reactivated** — The Mississippi Malleable Iron Co., Meridian, has been recently activated. The Mississippi foundry, subsidiary of Peoria Chain Co., will specialize in sprocket chains and light castings.

**Food Fair**—A Lilliputian model of an American vegetable oil processing plant will demonstrate U. S. food processing technology at the First World Agricultural Fair, Dec. 11, at New Delhi, India. It was designed and built by Gridler Process Equipment Div., Chemetron Corp., for the U. S. Dept. of Agriculture's display at the fair.

**Surrounded**—The Miles Chemical Co., Elkhart, Ind., has completed its \$3.6 million expansion of a new facility built entirely around the existing plant. The citric acid plant will more than double its current production. Output is estimated at over 15 million lb annually.

**New Firm** — Herbert Drapkin, president, Anchor Metals Inc., has formed a new and separate corporation known as Anchor Alloys, Inc. The new concern is located at 968 Meeker Ave., Brooklyn, N. Y. Anchor Alloys will specialize in precious alloys required in making electronic semiconductors.

**Continental Gin**—The newly organized Continental Conveyor & Equipment Co., Birmingham, has purchased the materials handling div. of Continental Gin Co. The new company will move to a new plant at Winfield, Ala., early in 1960. It will operate in the Continental Gin plant.

**Start at Saline**—Hoover Ball & Bearing Co., Ann Arbor, has started construction of a research and development building, adjacent to its machine tool subsidiary, Uniloy, Inc., at Saline, Mich. It will house a controlled atmosphere electronics laboratory.

**Steel for Addition**—The R. C. Mahon Co., Detroit, will furnish all structural steel for a new \$3 million addition to General Motors' Saginaw, Mich., Steering Gear Div. facilities. Contract calls for fabrication, delivery and erection, by mid-December, of 1350 tons of steel for the addition, slated for completion by next April.

**New Book Out**—The American Machine Tool Distributors Assn. has issued a new directory. It lists members and the lines they represent, all builders and their distributors, and the cities in which members are located. Copies may be purchased at \$2 from the Association, 1500 Massachusetts Ave., N. W., Washington, D. C.



**"You're carrying your little misunderstanding with the office manager a bit too far, Rogers."**

**Churchill Borough** — Westinghouse Electric Corp. will build a research and development center in Churchill Borough, near Pittsburgh. Ground will be broken in 1960 for two new buildings. Full occupancy of the facilities is scheduled for 1961.

**Overseas Pact** — Alco Products, Inc., has concluded agreement with Associated Electric Industries, Ltd., London, for joint collaboration in the design, manufacture and sale of diesel-electric locomotives. Effective immediately, it covers the design and manufacture of locomotives of 900 hp and higher.

**Information Please**—A brochure describing a new ultra-high pressure blast furnace, utilizing a 40 p.s.i.g top pressure to double pig iron output, has been prepared by Koppers Co., Inc., Pittsburgh. Copies can be obtained from the Engineering & Construction Div. of the company, 1124 Koppers Bldg., Pittsburgh 19, Pa.

**Pennsylvania Merger** — Pittsburgh-Des Moines Steel Co. and Hammond Iron Works of Warren, Pa., have merged. The combined company will be known as Pittsburgh-Des Moines Steel Co. It will specialize in metal fabrication and construction and will continue to manufacture the products of Hammond Iron Works.

**At the Polls** — The Foundry Equipment Mfrs. Assn. Inc., has elected the following officers: E. A. Borch, National Metal Abrasive Co., president; R. A. Brackett, The Spencer Turbine Co., first vice president; C. G. Hawley, The Jeffrey Mfg. Co., second vice president.

**Lukens Buys**—Lukens Steel Co., Coatesville, Pa., in accordance with the option on its World War II facilities contract, has purchased the facilities and equipment installed by the U. S. Navy during 1941 and 1942. The purchase price was \$4.9 million.

# are you selling technical management ?

Somewhere along the line, the technical manager will use his fund of knowledge to pass judgment upon your product, or a competing product, to solve the metalworking problem that is his responsibility.

He's important — this technical man who is president, plant manager, materials or metallurgical engineer — because it is his job to *care what happens to metals*. We call him the "metals engineer," and there is but one publication that speaks directly, exclusively, to him. That publication is Metal Progress, the monthly engineering magazine of his society, the American Society for Metals.

Covering the engineering aspects of metals, Metal Progress finds your man, the one you're missing, and puts him into a receptive frame of mind where your advertising can help him solve another problem. This is why it is so important to consider Metal Progress a vital part of your *complete* advertising program.

## Metal Progress

Published by The American Society for Metals

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L/R: D. J. Cash,  
Process Engineer,  
and H. F. Jordan, Jr.,  
Chief Administrative  
Engineer—  
The Cleveland  
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Co.

when in Cleveland, visit  
our new headquarters...



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When you make deep drawing quality steel avoid the harmful effects of silicon and carbon by standardizing on *pure* manganese—ELECTROMANGANESE<sup>®</sup>. No carbon, no silicon, no other obnoxious impurities. What you need is what you get. Write for Bulletin 201 and price list to Technical Literature Section, Foote Mineral Company, 438 Eighteen West Cheltenham Building, Philadelphia 44, Pa., or Box 479, Knoxville 1, Tenn.

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THE IR



**R. T. O'Keefe, Jr.**, elected chairman of the board, Kropp Forge Co., Chicago.

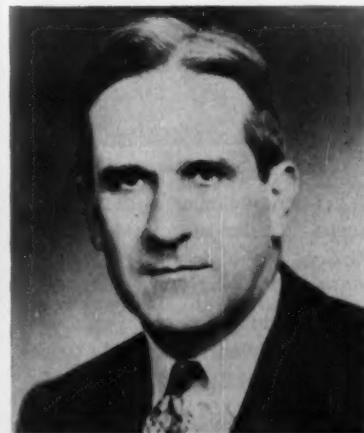
Tonawanda Iron Div., American-Standard—**R. L. Cleveland**, appointed president.

B. & J. Spring & Equipment Co.—**W. H. Brodie**, elected president and chief executive officer.

The Mathes Co.—**Harold McDonald**, elected vice president, manufacturing.

Gate City Steel, Inc.—**N. R. Knox**, elected chairman of the board, **H. P. Kibbey**, named president and chief executive officer.

Cromwell Paper Co.—**Herbert Fleck**, named vice president, production, Chicago and Trenton, N. J., plants.



**J. P. Craven**, elected vice president, Manufacturing Dept., Boiler Div., The Babcock & Wilcox Co., Barberton, O.

The New Jersey Zinc Co.—**L. S. Pricher**, elected vice president.

The Gates Rubber Co.—**F. S. Bosley**, named executive vice president, manufacturing.

United Air Lines—**G. E. Keck**, elected vice president, maintenance.

Firth Sterling Inc., Steel Div.—**R. K. Hopkins**, appointed vice president and general manager.

Arcrods Corp.—**H. M. Peterson**, appointed vice president and controller.

Vitro Chemical Co.—**R. C. Cole**, named vice president, manufacturing; **P. R. Kruesi**, named vice president, research and development; **M. H. McAllister**, becomes vice president.

Deere & Co.—**E. F. Curtis**, elected executive vice president; **G. T. French**, elected vice president, manufacturing.

National Can Corp.—**E. L. Smith**, elected secretary.

Revere Copper & Brass Inc.—**H. O. Howard**, appointed asst. manager, industrial sales, New York headquarters.



**Frans Brouwer**, named manager, new products development, Industrial Electronics Div., Stewart-Warner Electronics, Chicago.



**S. M. Kaplan**, elected president, M. S. Kaplan Co., Chicago.

Kennecott Copper Corp.—**M. D. Ayers**, appointed director, engineering.

Columbus McKinnon Chain Corp.—**W. H. Devonshire**, appointed manager, commercial development.

Crucible Steel Co. of America, Spring Div.—**J. A. Wagg**, appointed sales manager.

Brown & Sharpe Mfg. Co.—**J. E. Kochhan**, named asst. general sales  
(Continued on P. 146)



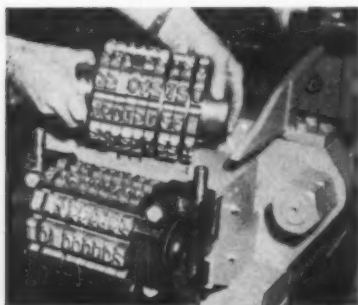
**E. L. McDonald**, named manager, new products marketing, Industrial Electronics Div., Stewart-Warner Electronics, Chicago.

# Electronic STAMPING

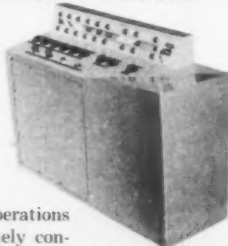


*for* **SLABS  
BLOOMS  
BILLETS**  
*with remote control*

The newest marking development for stamping heat, cut, and ingot numbers into hot steel. Big, easy to see characters are stamped at the touch of a button. Number changing automatic and away from heat.



View shows 9 rugged stamping wheels with  $\frac{3}{8}$ " characters.



All operations remotely controlled. Numbers are set, checked, and stamped from this console.

*For full details contact*

**JAS. H. MATTHEWS & CO.**  
3962 FORBES AVENUE  
PITTSBURGH 13, PA.

(Continued from P. 145)

manager, Industrial Products Div.; **R. H. Massie**, named director of systems, **Alex Christensen**, named sales manager, **Brown & Sharpe Ltd.**; **M. C. Barney**, named International machine tool representative, **Providence, R. I.**

**Reynolds Metals Co.**—**MacDaniel Williams**, named asst. director, sales training, **Richmond, Va.**



**R. W. Kinnard**, appointed manager, finance, **Metallurgical Products Dept.**, **General Electric Co.**

**Koppers Co., Inc.**, Engineering & Construction Div.—**Elliott Preston**, named manager, development section; **H. W. Fricke**, promoted to general superintendent, **Operating Dept.**; **H. B. Edwardsen**, named coke oven superintendent, **Operating Dept.**; **L. G. Tucker, Jr.**, named technical advisor, development section.



**J. A. MacLeod**, named works manager, **Aluminum Co. of America's** utensil plant, **Chillicothe, O.**



**E. J. Ferris, Jr.**, named factory manager, **Pratt & Whitney Co., Inc.**, **West Hartford, Conn.**

**Crucible Steel Co. of America**—**E. A. March**, appointed asst. works manager, **Midland, Pa.**, plant; **G. F. McCracken**, named division superintendent, technical services.

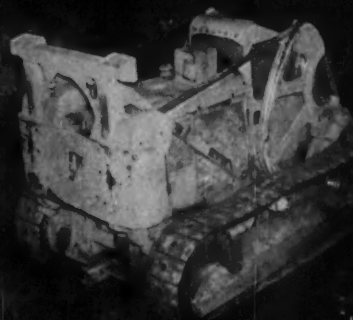
**Morse Twist Drill & Machine Co.**—**M. E. Yancey**, appointed sales representative, **North and South Carolina.**



**H. F. Randolph**, appointed general sales manager, **Central Div.**, **Kaiser Refractories & Chemicals**, **Mexico, Mo.**

**Aluminum Co. of America**—**G. A. Eagleton** and **H. H. Gnuse, Jr.**, named asst. chief power engineers.

**Armco Drainage & Metal Products, Inc.**—**G. B. Hutchinson**, appointed manager, production engineering.  
(Continued on P. 150)



# WESTERN UNION TELEGRAM

1201

## SYMBOLS

DL = Day Letter

NL = Night Letter

LT = International

Letter Telegram

## CLASS OF SERVICE

This is a fast message unless its deferred character is indicated by the proper symbol.

The filing time shown in the date line on domestic telegram is STANDARD TIME at point of origin. Time of receipt is STANDARD TIME at point of destination.

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RE: EIMCO SPECIAL STEEL MILL LOADERS:  
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MANAGEMENT SOONEST POSSIBLE  
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THE COMPANY WILL APPRECIATE SUGGESTIONS FROM ITS PATRONS CO

The list of steel mills and companies increasing their output and profit with Eimco Special Steel Mill Loaders reads like a "Who's Who" of the industry! Eimcos do what other can only claim . . . and Eimcos do it efficiently, economically and with minimum maintenance.

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## THE EIMCO CORPORATION

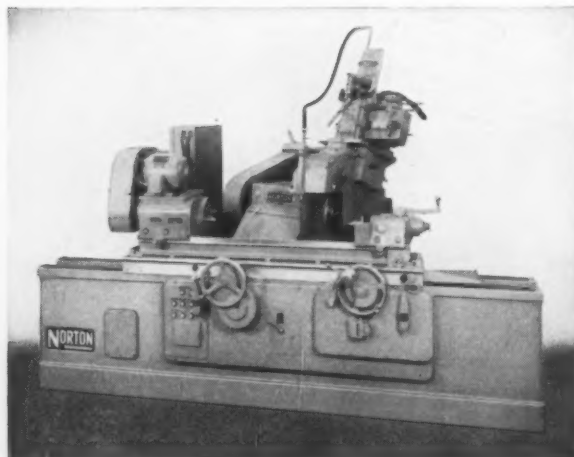
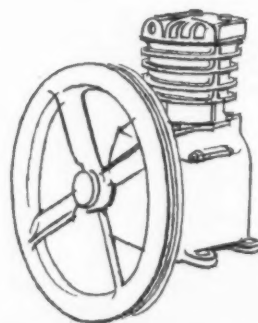
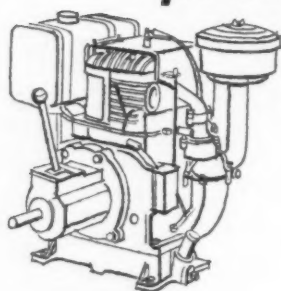
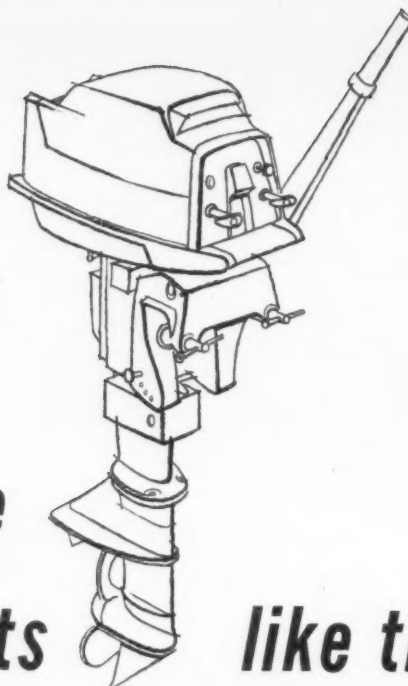


### TRACTOR LOADER DIVISION

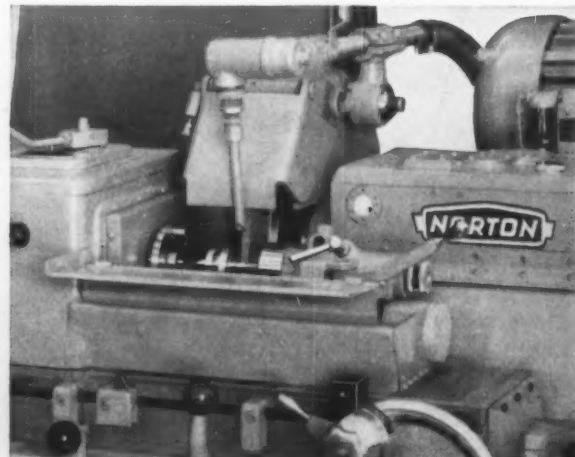
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EXPORT OFFICE: 51 - 52 SOUTH STREET, NEW YORK, N. Y.  
BRANCHES AND DEALERS IN PRINCIPAL CITIES THROUGHOUT THE WORLD

*If you make  
products like these.....*

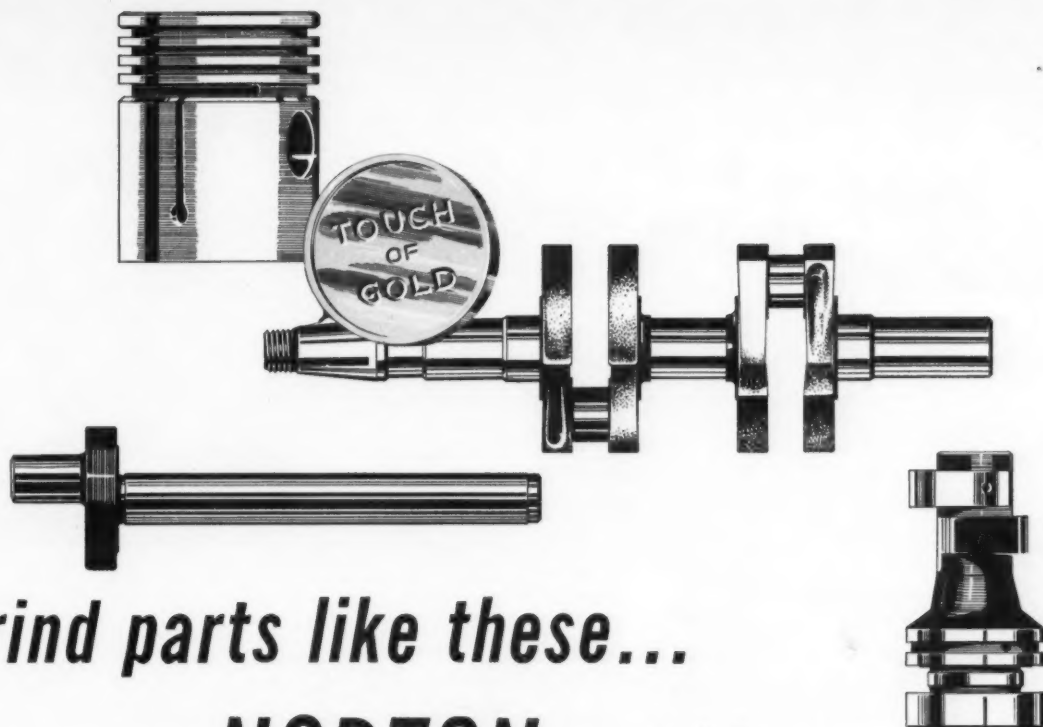


**A Norton Type CV-4 Angular Wheelslide Grinder, 10" semiautomatic, grinds the bearing diameters and adjacent shoulders of the outboard engine crankshaft shown above. Two other Norton machines are used in grinding this part: a 10" Type LCTU for the center main bearing and a 10" Type CTU CRANK-O-MATIC® crankpin grinder for the throws.**



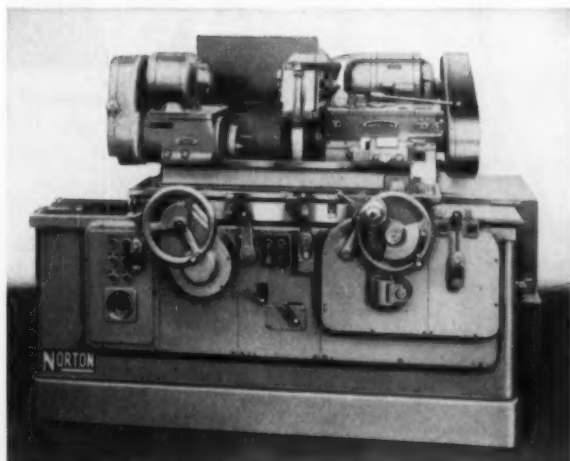
**A Norton CAM-O-UNIT® Mechanism attached to a Norton Type CTU cylindrical grinder. This smooth-working grinding team broadens the scope of a proved cylindrical grinder, assuring excellent, low-cost grinding of the small piston and the motorcycle camshaft shown, as well as other special shapes.**

\*Trade-Mark Reg. U.S. Pat. Off. and Foreign Countries



*grind parts like these...*

*on **NORTON** machines*



**A Norton Type CTU Cylindrical Grinder, 6" x 18" semi-automatic, with live spindle headstock, is used for grinding the household refrigerator compressor shaft, shown above. Areas ground are the short off-set diameter, the shoulder and part of the shaft — typical of the Type CTU's ability to perform several grinding operations at one time.**

The longer it takes you to grind parts for popular, mass-produced products, the more it costs you. If your grinding machines are below par, so are your profits.

Norton grinders can help you cut production time and costs to the very lowest. You have plenty to choose from — cylindrical, angular, crankpin and other grinder types, together with CAM-O-UNIT mechanisms that enable CTU machines to grind cams and special shapes with precision accuracy.

Norton grinders — all of them — are engineered for fast, accurate, easy operation, simplified maintenance and long, trouble-free service life. By combining several grinds in one job, a single Norton machine for your production can easily replace two or more ordinary grinders.

Your Norton Man, an expert grinding engineer, is always ready to help you select the grinding equipment you need to improve product quality and build your profits. **NORTON COMPANY**, Machine Division, Worcester 6, Mass. District Offices: Worcester, Hartford, Cleveland, Chicago, Detroit. In Canada: J. H. Ryder Machinery Co., Ltd., Toronto 5.



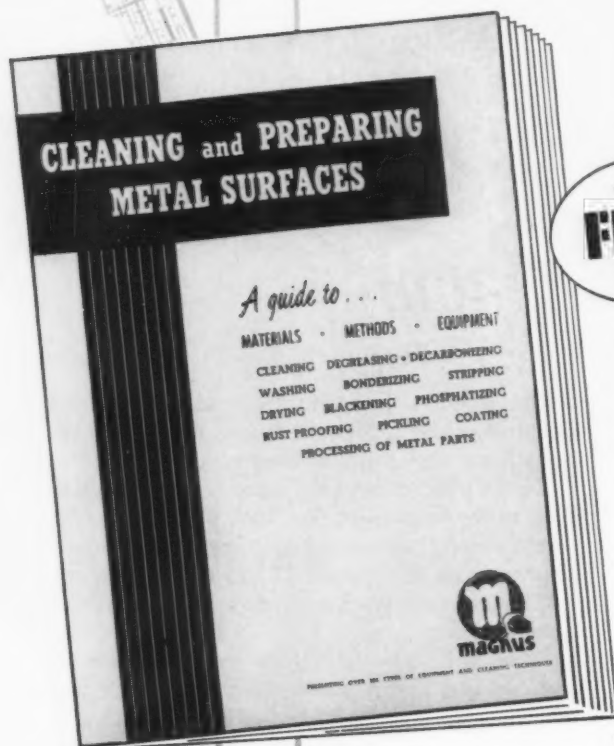
**GRINDERS and LAPPERS**

**Making better products . . .  
to make your products better**

**NORTON PRODUCTS:** Abrasives • Grinding Wheels • Grinding Machines • Refractories • Electro-Chemicals — **DEER-MANNING DIVISION:** Coated Abrasives • Sharpening Stones • Pressure-Sensitized Tapes

# Planning A New Production Line to Trim Costs?

Then you owe it to yourself to consider the time, labor and material savings which go hand in hand with the better results offered by automatic cleaning methods. Write today for this new complete guide to modern cleaning with vital information on ways to integrate it with your production.



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HANDBOOK

PLEASE RUSH FREE CLEANING HANDBOOK

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CHEMICAL COMPANY, INC.  
EQUIPMENT — MATERIALS — METHODS

A WORLD-WIDE ORGANIZATION SPECIALIZING IN THE CLEANING AND PROTECTION OF ALL SURFACES.

(Continued from P. 146)  
neering, Middletown, O., headquarters staff.



**M. N. Burleson**, named product director, aluminum cans and rigid foil containers, Reynolds Metals Co., Richmond, Va.



**J. W. Ross**, appointed manager, primary metals industries sales, Industrial Truck Div., Clark Equipment Co.

Jones & Laughlin Steel Corp., Vesta-Shannopin Coal Div.—**H. E. Steinmann, Jr.**, appointed chief mining engineer, California, Pa.

## OBITUARIES

**J. G. Berry**, 45, founder and president, Berry Steel Co., Roselle, N. J.

**J. J. Noland**, 67, president, Central Foundry Co., Holt, Ala.

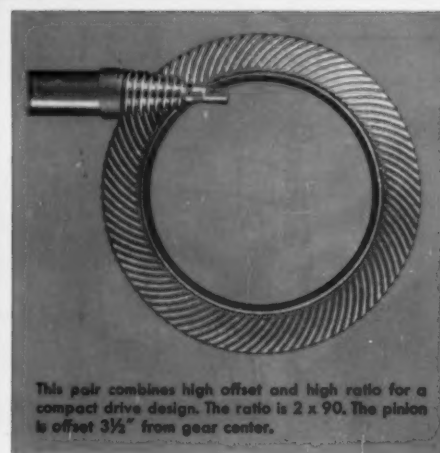
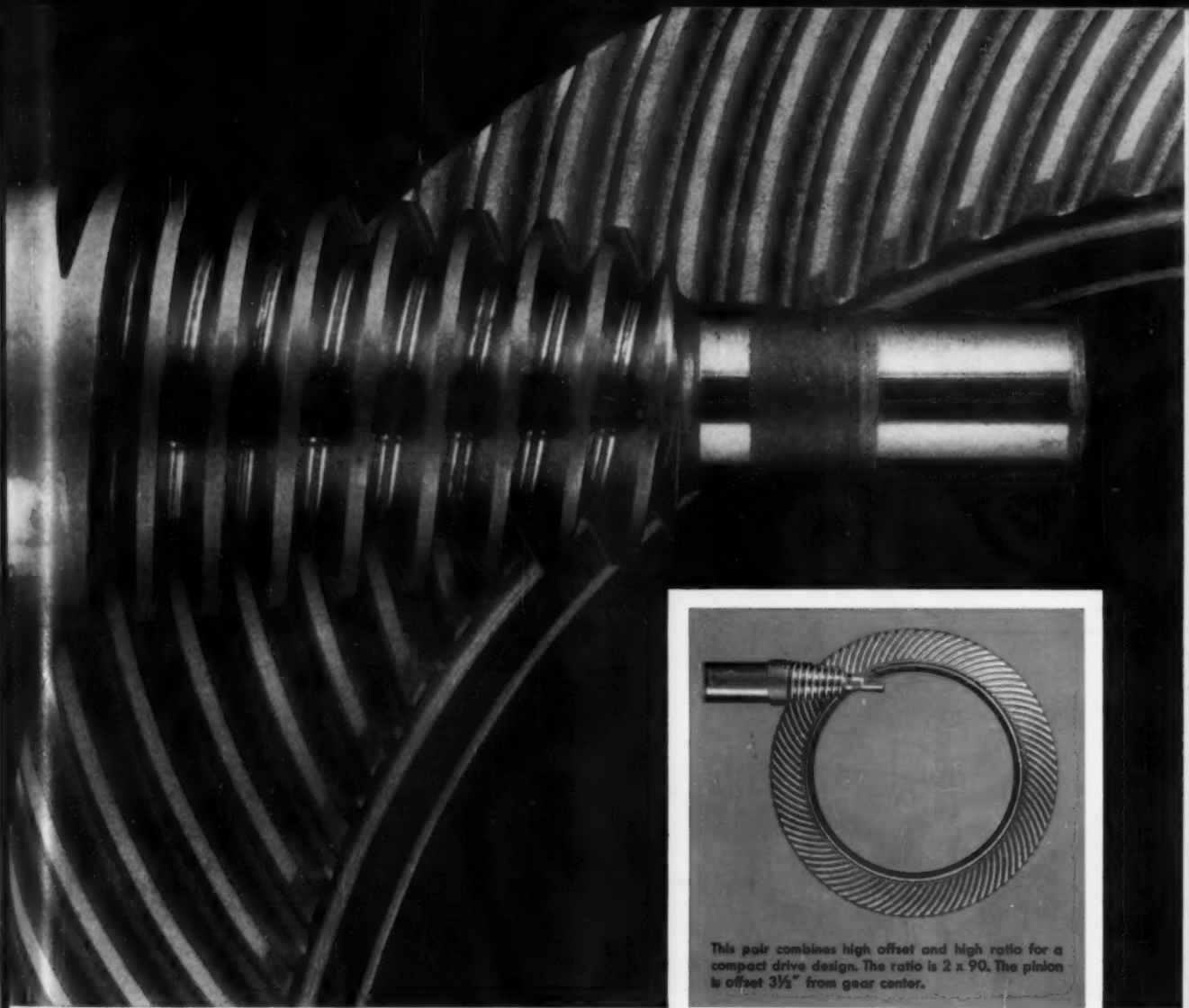
**H. W. Prentis, Jr.**, 75, chairman of the board, Armstrong Cork Co., Lancaster, Pa.

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This pair combines high offset and high ratio for a compact drive design. The ratio is 2 x 90. The pinion is offset  $3\frac{1}{2}$ " from gear center.

## See how the teeth "wrap around" this high-reduction pinion

This is a high-ratio hypoid gear. In principle, it is not different from more conventional hypoids produced by the Gleason Works. But . . .

If you look closely at the pinion, you'll notice that the teeth tend to "wrap around" it. This design is extremely well suited for high reduction, strength and compact design.

The result is a conical (or sometimes cylindrical) pinion which permits *continuous tooth action—even with just one or two teeth!* Compared to corresponding bevel pinions, its diameter is greater for higher strength. An extended shank on cylindrical pinions makes *very rigid* straddle mountings practical.

You can design a *compact* unit, because high offset is possible! For high-offset or high-ratio pairs, the "wrap around" tooth

design provides an extra measure of the smooth, quiet tooth action of hypoid gears.

High-ratio hypoids can be cut on the same Gleason equipment that is used on more familiar spiral bevel gears and hypoids. You can also use the same testers, quenching presses and other auxiliary Gleason equipment you're using now. Grinders are available for applications requiring precision finish.

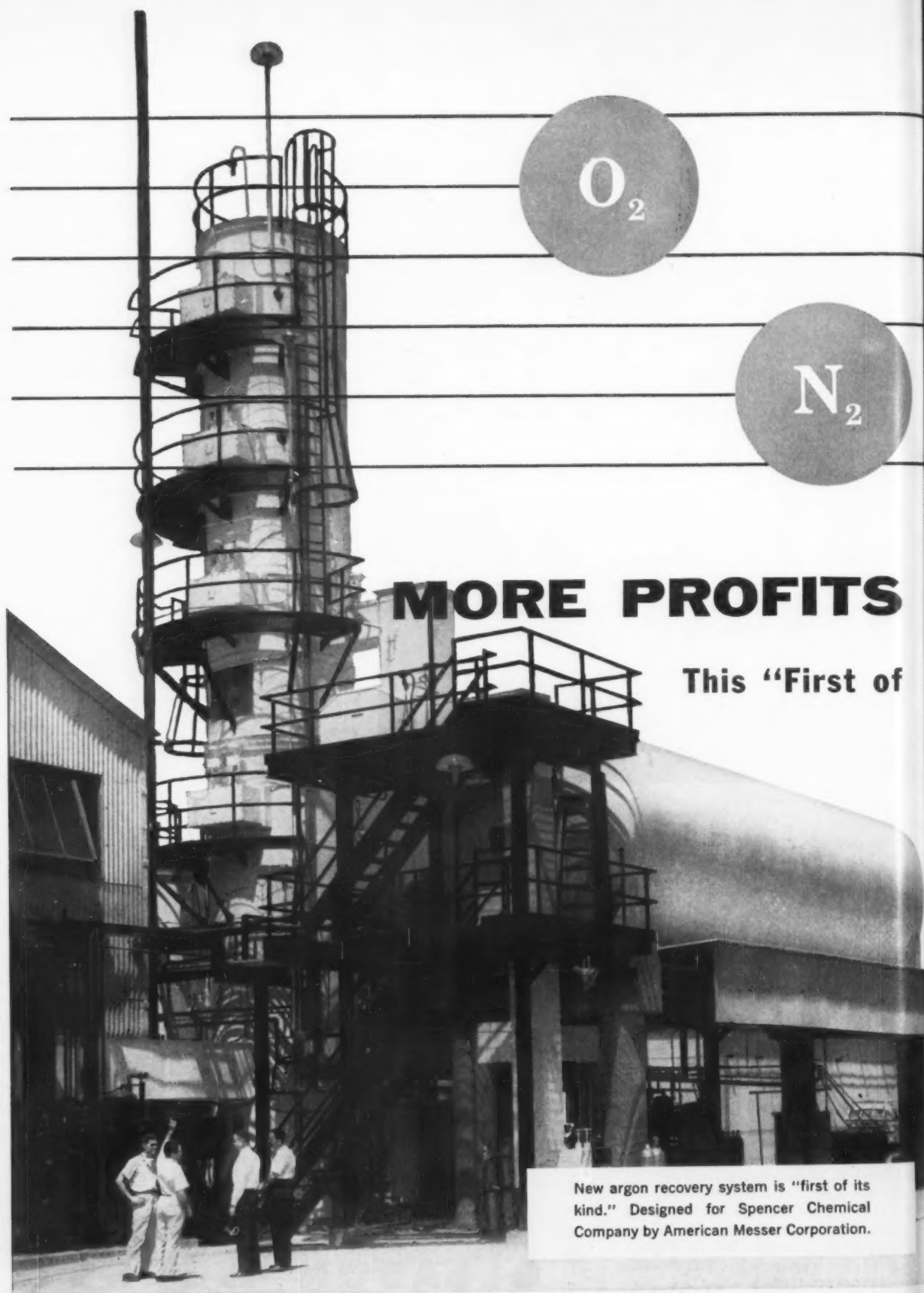
High-ratio hypoids can be produced by the Gleason Works for ratios of 1:10 or 1:40 or even higher. They are finding a growing number of applications in such diverse fields as farm machinery, instrumentation and office equipment.

You can get more information about Gleason high-ratio hypoid gears by writing for free literature. Submit your prints for recommendations.



# GLEASON WORKS

1000 UNIVERSITY AVE., ROCHESTER 3, N.Y.



O<sub>2</sub>

N<sub>2</sub>

## MORE PROFITS

This "First of

New argon recovery system is "first of its kind." Designed for Spencer Chemical Company by American Messer Corporation.



CO

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*Messer*

## IN AIR SEPARATION?

### Its Kind" Plant May Give YOU Some New Ideas

How to make an air separation plant more profitable is illustrated by a recent accomplishment of Spencer Chemical Company. Through a new cryogenics system, Spencer now turns out substantial quantities of Argon from its Vicksburg, Miss. operation originally designed for making ammonia.

#### Spencer Selects American Messer

Spencer asked American Messer to investigate the possibilities of augmenting the ammonia plant's facilities to manufacture argon. Messer went to work. It undertook the design of a unique process to achieve the results Spencer was seeking.

What happened? Today this Vicksburg plant produces 3,000,000 cu. ft./mo. of ultra-pure argon from what was formerly a waste stream from the syn gas nitrogen scrubbing section of the ammonia operation.

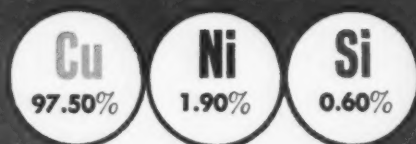
This method permits much higher recovery of argon from the ammonia producing process than was previously possible by air separation techniques. Yet it in no way influences or upsets the balance of oxygen and nitrogen production important to the basic function of the plant-making ammonia.

#### Interested In Oxygen, Nitrogen, Argon, Helium?

American Messer is equipped and ready to consult with anyone whose manufacturing process could benefit from a more efficient and economical use of cryogenic processes. Be sure of the finest technical counsel! Your inquiry will be welcomed. American Messer Corporation, Chrysler Building, 405 Lexington Avenue, New York 17, N.Y.

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**NEW**  
FROM  
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*Announcing*  
**CUNISIL-837**

a versatile high-strength, heat-treatable  
copper alloy with this valuable  
combination of properties

**HIGH  
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90,000 psi min., in  
precipitation-hardened  
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**READY  
MACHINABILITY**  
Compared with Free  
Cutting Brass Rod at 100,  
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approximately 40.

**HIGH  
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70,000 psi @ .50%  
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min., in precipitation-  
hardened condition.  
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4 x D, min., 8%.

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Comparable to copper  
and Everdur copper-  
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CONDUCTIVITY**  
30 to 42% IACS  
as heat treated.

**AVAILABLE  
AS ROUND ROD**  
In straight lengths  
including  $\frac{3}{16}$ " dia.  
to 1" dia. In coils  
 $\frac{3}{16}$ " dia. to  $\frac{5}{8}$ " dia.  
Inquire for  
other sizes.

**EXCELLENT  
COLD FORMING**  
Extremely easy to work  
cold before hardening  
heat treatment.

**METALLURGICAL COMMENT.** Most of the nickel and silicon in heat-treated Cunisil are present as an intermetallic compound, nickel silicide, and it is the precipitation of nickel silicide in the form of particles of submicroscopic size by a relatively low temperature heat treatment that accounts largely for the distinctive properties of the alloy.

Prior to the hardening heat treatment, the alloy is brought to a proper condition for hardening by giving it a solution anneal at a much higher temperature and then a quenching from this temperature; at this stage the alloy is quite soft and in a condition for drastic cold-working operations. The hardening heat treatment consists of heating at a controlled temperature for a definite length of time to obtain the desired mechanical properties.

**CUNISIL-837** is a high-strength, corrosion-resistant alloy that includes many of the desired qualities of Silicon Bronze or Everdur®. Its applications to date have been primarily in the electrical equipment field.

**FOR MORE INFORMATION**—see your American Brass representative or write: The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont.

**ANACONDA®**  
Copper and Copper Alloy Mill Products  
MADE BY THE AMERICAN BRASS COMPANY

# How Materials Protect Missiles From Re-Entry Damage

**Re-entry of an ICBM into the atmosphere is "unrelated to any past developments" in technology.**

**Some studies into this problem have been recently declassified. It permits public discussion of some of the details of thermal protection.**

■ Not too long ago, several ICBM and IRBM nose cones were recovered after a successful flight and exhibited in public. Information revealed that the cones were made of

a relatively, lightweight, "ablation" material. This slow burning material was the key to a safe re-entry into the earth's atmosphere.

It has been said that the protection of a space vehicle from thermal damage during its re-entry into the atmosphere is one of the special problems connected with the building of long range missiles.

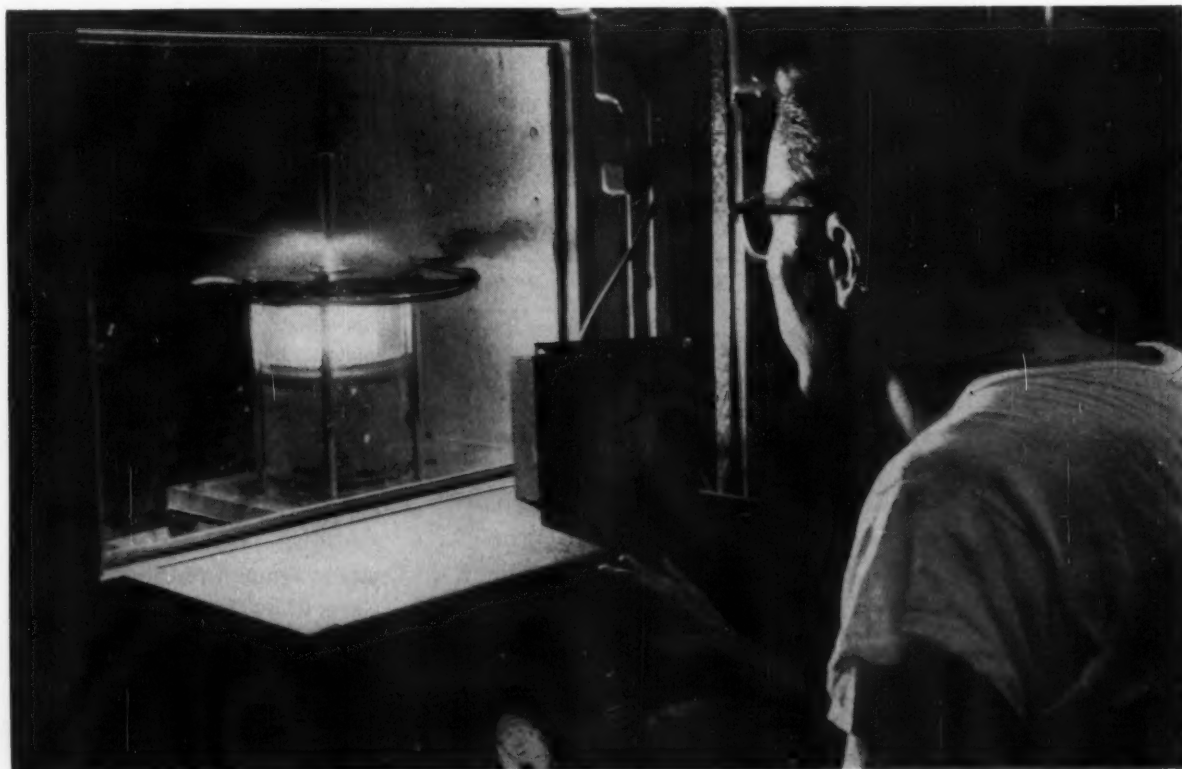
Lt. Gen. B. A. Schriever, Commander, Air Research and Development Command, stated: "I consider the development of the nose cone . . . one of the outstanding

scientific accomplishments of this century."

What is the re-entry problem? Why was material selection for the nose cone such a different task?

**Declassify Studies** — Recently, some of the work that was done on these problems was declassified. It enabled the delivery of a paper entitled "Thermal Protection for Re-Entry" before the American Institute of Chemical Engineers, in St. Paul, September 27-30, 1959. Here are some highlights of the paper.

The authors, Irving J. Grunfest



**HOTTER THAN SUN:** Carbon arc, encased in a water swirl, heats nose cone material to 15,000°F—

greater than the sun's surface temperature. The scientist is protected by dark glass.

# How Materials Hold Up Under Exposure

TABLE 1—Relative Durability of Materials\*

MATERIAL	Relative Weight Loss In Water Stabilized Arc.—17,000 °F (2000 Btu/ft <sup>2</sup> /sec)
Graphite	0.58
Nylon Phenolic	1.2
Silicon Carbide	1.7 - 6.3
Refrasil-Phenolic	2.2
Glass Phenolic	2.2
Silica	2.3
Alumina	6.9 - 13.7
Mullite	8.22
Zirconia	12.9
Copper	80.

\* 10-second tests

TABLE 2—Relative Erosion Rates vs Exposure Temperature

MATERIAL	Resin, pct	Temperature, °F		
		3300	4800	17,000
Phenolic-Glass Cloth	27	1.0	2.7	2.5
	37	1.2	2.5	2.0
	44	1.6	2.2	2.0
Phenolic-Refrasil Cloth	65	1.7	1.8	1.4
	41	1.4	1.0	2.1
	57	4.7	2.5	1.0

and Lawrence H. Shenker, of the Missile and Space Vehicle Department, General Electric Co., Philadelphia, discuss the requirements of materials for re-entry.

Mr. Shenker and Dr. Grunfest point out that a missile on a 5000-mile flight will meet a temperature of 12,840°F during re-entry. (This value is based on an altitude of 100,000 ft.)

"This temperature is above the melting or vaporization point of any known material. Furthermore, scientists are pessimistic about the prospects of discovering solid materials which will be stable at even 9000°F."

## Plastics Rate Near Top

TABLE 3—Heat Absorbed and Gas Generated at 8500°F

SUBSTANCE	Heat Absorbed (cal)	Relative Gas Volume (moles)
H <sub>2</sub> Gas	67,000	1.0
(CH <sub>2</sub> ) <sub>n</sub> (Organic Plastic)	24,000	0.21
(CH) <sub>n</sub> (Organic Plastic)	20,600	0.15
Graphite	16,670	0.08
H <sub>2</sub> O	14,500	0.16
Beryllium	9,876	0.11
Beryllia	7,080	0.08
(C <sub>2</sub> F <sub>4</sub> ) <sub>n</sub> (Teflon)	6,300	0.06
(C <sub>6</sub> H <sub>12</sub> O <sub>6</sub> ) <sub>n</sub> (Cellulose)	5,780	0.10
Magnesia	5,500	0.05
He	3,525	0.25
Silica	2,800	0.05
Copper	1,600	0.016

\* Estimated Integrated Specific Heats from 75-8500 °F, equilibrium volume of gas generated per gram at 8500 °F for various substances.

**Slow Missile Down**—An obvious suggestion would be to use parachutes or other high drag to-weight ratio devices to slow the missile down. These might work because it has been suggested that less than one-half of the total vehicle would have to be parachute in order to permit safe re-entry. However, a complete and adequate deceleration is not achieved.

What about retro-rockets? A different situation exists if retro-rockets are used to slow the missile vehicle before it reaches the atmosphere; a large fraction of the vehicle would have to be propellant to produce this effect.

This thinking is based upon the present art of propulsion. The efficient use of nuclear energy might change this situation. But it now seems more practical to develop

materials to withstand the heating effect.

**Stable Materials** — How about radiative cooling? It should be a very attractive device for thermal protection. But the energy radiated depends on the fourth power of the temperature. Therefore, it requires structural materials stable at high temperatures. Also, care must be taken to insulate the vehicle to maintain acceptable inside temperatures.

There are other types of cooling to consider. One method requires the circulation of coolant behind the skin (underskin cooling). Another system involves mass addition provided by pumping fluids through a porous skin (transpiration cooling) or the sublimation of the surface material itself (ablation). The added material from the missile surface reduces or blocks the transfer of some of the heat.

The underskin and transpiration systems provide a vehicle with an unchanging body shape in flight.

If the effectiveness of a heat absorbing system could be raised to 50,000 Btu/lb, the weight of the heat protection system would be negligible compared to the size of the structure.

**Search For Materials**—It is obvious then that proper skin materials must be found. The authors experimented with several hundreds of metals, ceramics and plastics. They used a number of testing facilities such as hot air generators, chemical flames, a solar furnace and a variety of electric arc devices.

Table 1 lists some of the recently tested materials. It is seen that, at 17,000°F, plastics are relatively more durable than the usual refractory materials and are surpassed only by graphite.

Suppose we test these plastics at other temperatures? Table 2 shows that the ranking of these materials are affected by the test conditions. In this table, the erosion rates of the most durable materials in a particular atmosphere are given a rating of

one. The other materials are then rated according to the ratio of their erosion rates.

**Properties Change**—Examination of the table reveals that the relative durabilities of the phenolics change when tested at different temperatures.

Two important facts emerge. First, the optimum material for one temperature may be unsatisfactory for another. Second, chemical considerations can be as important in material selection as are mechanical and physical properties.

In other words, the choice of material depends on the specific job it is asked to do.

Why does a design engineer select a plastic for high temperature use? Mr. Shenker and Dr. Grunfest point out that in many cases it is because plastics decompose slowly and superficially, trading mass for heat. Also, gas is given off which interferes with the convective transfer of heat to the surface. These are the materials that are described as ablative.

**Compare Properties**—A comparison of the heat absorbing and

gas generating properties of various substances is given in Table 3.

These data show good reason why organic materials are considered for parts exposed to hot gases. Compared to other structural materials, organic materials have the highest potential heat absorbing and gas generating capacities. However, they have these highest ratings only if the temperature is high enough to dissociate the hydrogen molecules into atoms.

Coke formation from the plastic during flight aids heat resistance because it allows a high surface temperature to develop. This reduces the gradients and increases back radiation.

Furthermore, if one product of the pyrolysis is carbon, it is likely that the other will be a hydrogen rich gas which has a high blocking effectiveness.

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**WITHSTANDS HOT BLAST:** Supersonic flame, at more than 5000°F, blasts new protective material which helps solve re-entry problems.



**FREEDOM OF DESIGN:** Tubing setup dodges structural members, hugging the contour of the ceiling.

## Streamline Your Piping System

**Flexibility is the key word in a successful piping system, especially if it's efficient.**

**This one's easy to install and requires much less space.**

■ Industrial piping systems are taking on a new look. This new approach is a streamlined coupling system, designed to rid plants of problems from static plumbing.

It took the combined efforts of many minds to put the job across. Plant engineers from a major chemical company knew the problems involved.

So they leaned heavily for advice from suppliers of welded carbon-steel tubing, malleable-iron fittings, valves, and heating torch equipment.

Now that the first setup is installed in one of the chemical concern's new plants, it's really reducing costs. Still another setup at the Lincoln auto plant, Wixom, Mich., speeds up the change-over of paint sprays for the automotive industry.

**Welded Tubing**—The basic unit is lightweight welded steel tubing. Wall thicknesses are about equal to Schedule 5S stainless. Design of the system is based on close tolerance, expanded end joints.

The ID of the expanded end is just about the same dimension as the OD of the tube body. Mating ends fit together with calculated clearance. Then they're brazed or soldered to form leak-proof joints.

The system rates 125 psi, 360°F. It has a smooth interior that promotes minimum pressure drop and hold-up. Sweep bends are made with conduit benders.

**More Lines**—Using the new system, you can erect about 30 pct more piping lines within a specific area. It also means a savings in labor and materials over conventional threaded piping.

The joint technique, called Smoothweld, was developed by Standard Tube Co., Detroit. Company officials only recommend the system for noncorrosive fluids and

atmospheres. Sprinkler systems and air lines are naturals in the industrial field.

Smoothweld tubing weighs about half as much as conventional tubing in corresponding sizes. And cost per lineal foot is less, too. The lighter weight simplifies installation procedures.

**One-Man Job**—Now only one man is needed to lift and install a length of tubing. In contrast, it used to take two men to erect the regular black pipe. The new system also provides lighter coiling, wall hangers, and overall supporting structures, thereby easing the job even more.

But one of the major advantages of this new tubing is the minimum space required for installation. Couplings are part of the tubing. In fact, they're scarcely larger than the OD of the tubing itself.

Workmen only need access to a small portion of the joint for brazing or soldering. As a result, you can erect the lines close to one an-



**SMOOTH BENDS:** Tube bending equipment, rather than angle couplings, provides smooth flow to lines.



**STREAMLINED JOINT:** Snug fit between plain and expanded ends of tubes results in improved coupling.

other. And that's useful in those confined areas you can't approach with wrenches and welding equipment.

**Smaller OD**—Since the tubing's OD is less than conventional pipe with an equivalent ID, the system provides further savings in space.

Although the average wall thickness of black pipe is greater than that of corresponding tubing, wall thickness at exposed threads is less than the wall thickness of any part of the tube or its connections. That's why thin-wall tubing systems achieve greater strength.

**Sound Joints**—To solder or silver braze the joint, workers apply heat from an oxyacetylene torch on one point. Capillary action in the close-fitting tube end draws molten metal around the whole point.

This fast, simple procedure insures leak-proof joints. And these same brazing or soldering techniques can be used as long as the tube tolerances maintain close fits.

The design of mating tube sections also prevents pockets or obstructions from forming on the internal joint surface. Such a design

leads to smooth flow of viscous fluids.

**Flows Paint**—Look what can happen in paint lines, for instance. Uneven surfaces in these lines tend to build up layers of paint. Before long, the load on pumping equipment increases. And it won't take much more time before the flow is cut off completely.

In most cases, tubing will require fewer mechanical connections than threaded pipe. Flow direction changes are made with smooth bends rather than angle couplings.

Using power or manual equipment, workmen can bend the tubing right on the site. The space available and the end requirements govern the choice of radii bends.

**Smooth Bends**—Large radius bends permit smoother flow than sharp bends or right-angle joints. They also reduce the pressure drop throughout the system.

Very often, a different type of liquid flows through the tubing. When that happens, smooth bends, as well as smooth internal joint surfaces, make the setup easier to clean.

If, however, limited space dic-

tates a right-angle directional change, fittings are readily soldered or brazed to the tubing.

**Adds More Equipment**—Two types of threaded outlet tees are used with these tubing systems to link them to other equipment. One is made from a short length of tubing with both ends expanded. The other is a forged steel unit.

Each type can be brazed or soldered into the line. By soldering or brazing forged steel unions into the line, you make it more flexible. This will meet an important requirement whenever lines must be opened for any reason.

You can add reducers and adapters to the system. These parts come in handy in attaching special equipment.

**Unitized**—In a sense, the system is unitized, since the couplings are self-contained in the tubing itself. Resistance welded from flat-rolled steel, the tubing is hydrostatically tested to 2000 psi.

The advantages of such a system are obvious. It offers consistent wall thicknesses and expanded tube ends with close tolerances. Such precise dimensions guarantee its success.

# Quick Chill Aids Hot-Working

## New Die-Quenching Process Reduces Critical Cooling Time

**Die-quenching of jet-age metals reaches a standstill when the die absorbs too much heat.**

**Here's an invention that solves this production bottleneck.**

■ There's more to the fabrication of jet-age metals than meets the eye. Sometimes, problems creep up in the least expected areas. Fortunately, most of these issues have happy endings.

Recently, engineers at the Ryan Aeronautical Co., San Diego, were able to come up with an ingenious answer to a cooling cycle problem. In addition to solving a production bottleneck, the invention is saving almost 100 manhr in the making

of a punch used in the forming operation.

**Need Quick Cooling**—Many alloys used in high-speed aircraft require special cooling cycles as part of the processing. One particular alloy, 17-7 PH stainless steel serves as an example. Ryan uses tons of this material in building pods and pylons for the Douglas DC-8 Jetliner.

Parts made of 17-7 PH are first formed from material in the annealed condition. A heat-treating process, known as the transformation cycle, makes the soft material extremely hard and brittle.

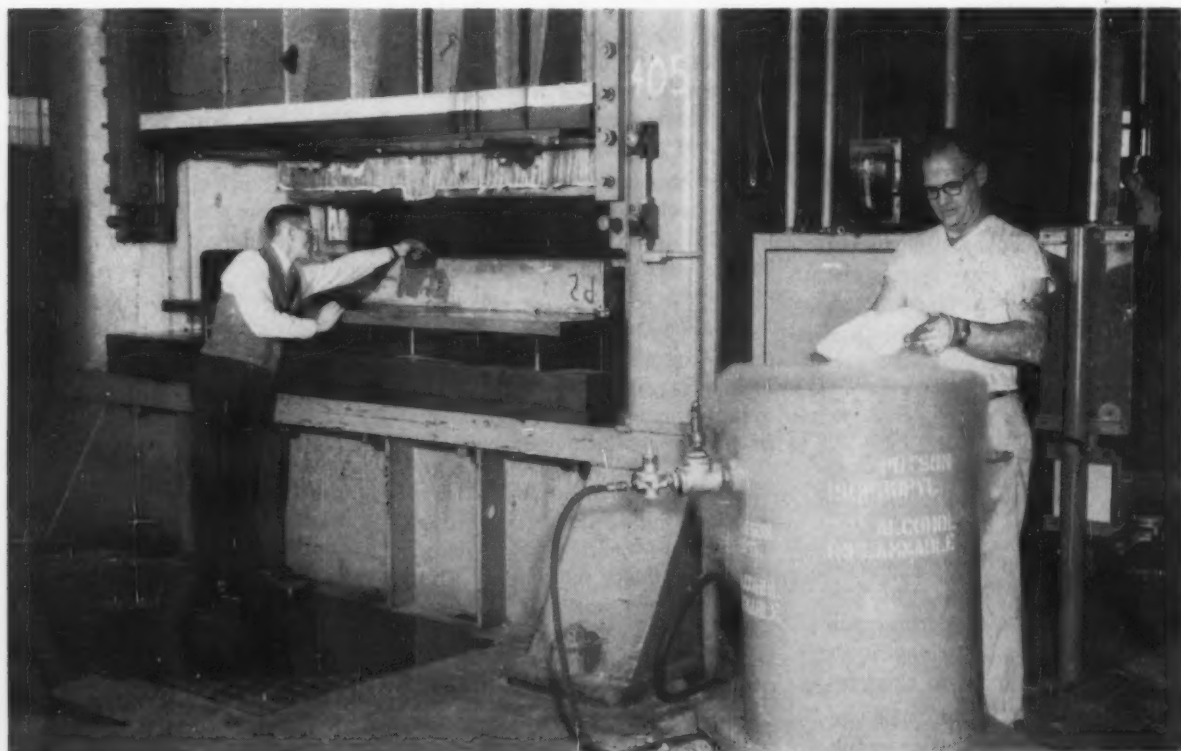
The metal is oven heated at 700°F, cooled in a finishing die to at least 80°F or lower, and then placed in a refrigerator. This is the

critical part of the transformation cycle. You can take no more than 15 minutes to move the part from the oven, through the die and into the refrigerator.

**Die Gets Too Hot**—Before the new process, the period in which the part cooled in the die was a major stumbling block. The die would absorb heat from the red hot metal until it lost its ability to chill the metal; soon it was no longer possible to chill the part in the time allowed.

Work came to a standstill until the die had cooled to a point low enough to permit operations to continue.

Ryan's new process cuts the time required for a cooling cycle from



**DRY-ICE COOLS AIR:** Inside the barrel is an airtight tank of dry ice surrounded by a mixture of dry ice

and isopropyl alcohol. Air passes through the ice under pressure and out a discharge pipe to the die.

10 minutes to less than 1 minute. Just as important, it keeps the die in which the metal is chilled, at a low temperature, permitting its constant use.

**Cast Pipe Into Die**—The invention has two separate facets. First, the die on which the metal is finish-formed is now cast with a 3-in. pipe running longitudinally through its center.

Holes are drilled through the face and sides of the die into the pipe. The pipe is threaded on each end to permit the attachment of tubing. The tubing in turn, connects to a portable cooling tank, which supplies cold air at sub-zero temperatures, at a pressure of 60 psi.

Before the die is put into operation, it and its companion punch are cold-soaked until both parts are at least 40°F or lower. During operation, the frigid air blasts through the die, keeping the die cold.

As the air escapes through the holes drilled into the face of the die, it chills the part to the desired temperature nearly ten times as fast as the previous method.

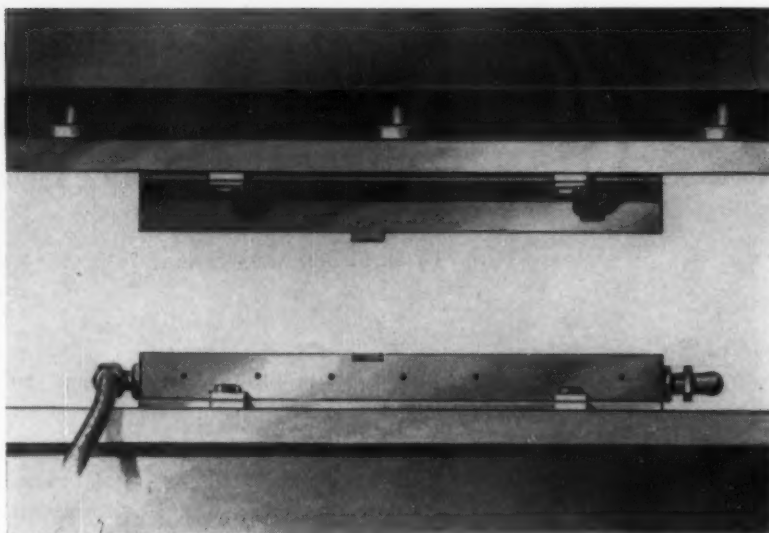
**Use Mobile Tank**—The second of the two inventions is the portable cooling tank. This is a barrel about 3 ft high and 26 in. diam. It is mounted on casters.

Inside the barrel is an airtight tank about 14 in. diam and 22 in. high. A 3-in. diam pipe runs through the side of the barrel, into the tank and within 2 in. of the bottom of the tank.

This air intake pipe is equipped with a connecting tee for air intake from the plant pressurized air supply, a pressure regulator, and a safety valve.

Extending from the top of the tank through the barrel on the side opposite the intake pipe is the air discharge pipe, which is connected to the pipe embedded in the core of the quenching die.

**Cool With Dry Ice**—The inner tank is filled with dry ice. The space between the tank and the barrel is



**CHILLS PARTS QUICKLY:** The blast of cold air, which quickly chills part to desired temperature, protects upper lead punch from fierce heat.



**ESCAPE THROUGH HOLES:** Cold air plays onto part through the holes indicated by Ryan engineer, John F. Reeser, inventor of the process.

filled with isopropyl alcohol and dry ice. Air is forced through the dry ice to the bottom of the tank. There, it rises through the dry ice into the discharge pipe and to the die.

Before the new method was installed, both die and punch were made of Kirksite from reference patterns.

Making the punch to the die was

a painstaking task. In making a particular punch, the reference patterns might involve 30 manhr of work, the molding and casting of the punch 6 manhr, and the matching-up process another 60 manhr.

With the new method, a simple lead punch is used. The finish die is used as the mold; the lead is poured into the die. This assures complete and accurate matching.

# Try Compromise Heat Treatments For Dissimilar Clad Metals

By R. C. Bertossa—Technical Director and A. C. Fortlage—Production Manager, Pyromet Co., South San Francisco, Calif.

**How do you heat-treat a clad plate whose constituent metals respond differently?**

**This description of various heat treatments and the properties they impart can serve as a guide.**

■ A growing number of industries are finding that no single metal or alloy meets all their metallurgical requirements. For that matter, the chemical and petroleum companies have been struggling with this problem for years.

A way out of this dilemma lies in the use of clad metals. These combinations of metals are adapted to fulfill needs which neither of the component metals could do alone.

However, metals differ in heat-treating characteristics. Thus, the dissimilar metal layers create heat-

treat problems since they must be treated as a unit.

**Need Special Treatment**—Each layer usually requires special treatment to get the best corrosion resistance and metallurgical features in the clad plate unit. Because of this, compromise heat treatments have been developed for the composite plate.

These treatments often deviate from conventional methods used for the individual metals. Some of these treatments are incorporated in the cladding processes, others after cladding.

The methods described here are designed for fabricated structures or vessels. They include no high-temperature solution treatments or other drastic treatments which might cause difficulties in performing on certain finished products.

**Soak Ferritic Stainless**—The

"400" series ferritic stainless steels, for example Type 405, are commonly used as corrosion-resistant clad layers in combination with thicker carbon steel backing layers; they are considered non-hardenable on heat-treatment.

The carbon steel provides thickness and strength for fabricated structures at low cost. The thin stainless layer supplies corrosion resistance.

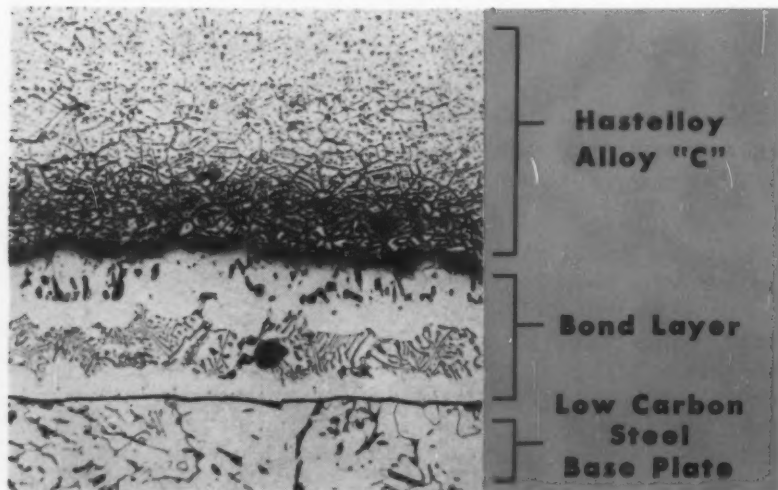
The compromise heat treatment for the stainless requires heating to 1600°F followed by air cooling to below 900°F. This normalizes the steel layer.

**Precipitate Carbides**—The material is then reheated to 1250°F and soaked long enough to cause a general precipitation of carbides in the stainless layer; this stabilization of carbides produces maximum corrosion resistance. Finally, it is air or furnace cooled to ambient temperatures.

In addition to stabilizing the carbides, the heat treatment also tempers the small quantity of martensite which may be present in the stainless layer.

The 1250°F temperature is deliberately used so as not to bring the carbon steel layer into its recrystallization range. Still, corrosion tests show the stainless layer to be on a par with materials stabilized at 1450°F.

**Harden Martensitic Steels**—Martensitic stainless steels are hardenable by thermal treatment. A common martensitic alloy used for cladding to low-carbon steel backing is Type 410.



**USE LESS CARBON:** Normalizing the steel plate will lower the corrosion resistance of the clad layer. A remedy is to use low carbon Hastelloy.

This clad material should be annealed before forming. This involves heating to 1600°F, followed by slow cooling through 1100°F, and air cooling to room temperature.

The carbon and/or alloy content of the steel backing plate should be sufficient to enable it to meet strengths specified by ASTM for chromium steel clad plate, if it's to be left in the annealed condition.

Another method which allows working of Type 410 martensitic stainless clad steels (where hardness is not desired) requires the use of controlled carbon content in the stainless. If the carbon content is restricted to 0.08 pct, the clad material can be given the same treatment as for Type 405.

#### Austenitic Steels Need Care—

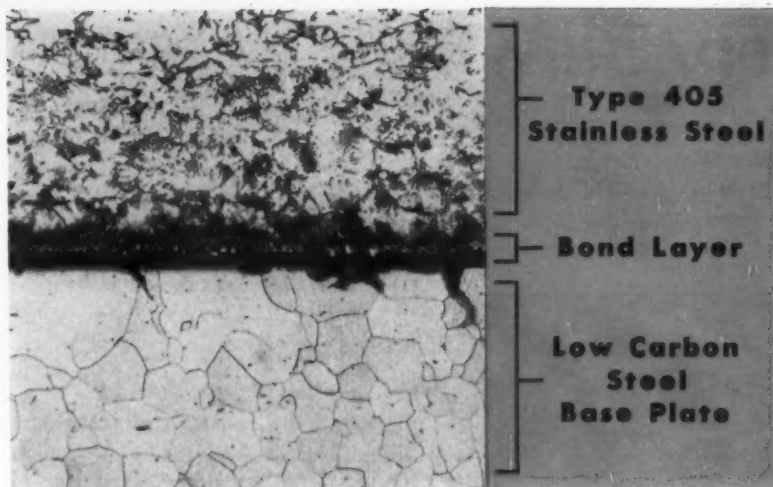
With austenitic stainless steels, you must avoid carbide precipitation and sigma phase formation. These affect corrosion resistance and physical properties.

A major problem in producing this type of cladding is the conditioning of the low-carbon steel backing material without disturbing the stainless. Normalizing in the range of 1600°F, or stress relieving or tempering at 1200°F, causes excessive carbide precipitation in the stainless layer.

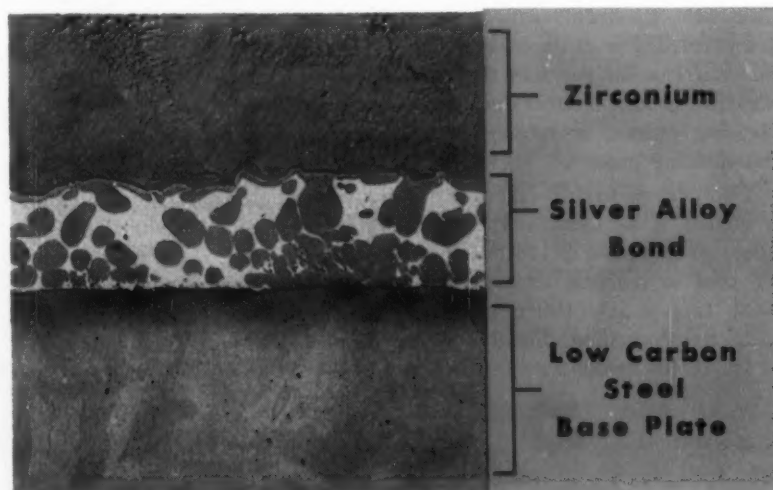
This results in a loss in corrosion resistance. Suppose you decide to solution heat treat from 1975°F, in order to keep the carbides dissolved. Then the problem of warpage crops up.

Several methods of getting around these difficulties have been devised. In stabilized Type 318 stainless steel, columbium, of about five times the carbon content, is added. It ties up the carbon on heating in the carbide precipitation range and thus prevents the depletion of chromium.

**Try Low Carbon Stainless—**You can use low carbon Type 316-L stainless if the composite plate or welded areas (during fabrication) must be treated within the carbide



**DON'T OVERHEAT:** Stabilize the clad ferritic stainless at temperatures low enough to prevent recrystallization of the carbon steel backing.



**KEEP AIR AWAY:** When heat treating zirconium clad composites, take protection against atmospheric gases. They can lower the ductility.

precipitation range. A carbon content below 0.03 pct reduces carbide precipitation and therefore minimizes or eliminates corrosion.

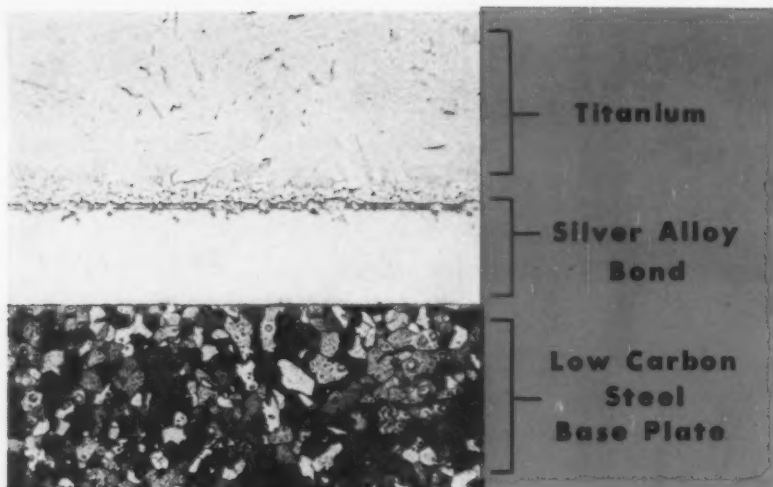
Quenched austenitic stainless claddings must be cooled from 1800°F to 750°F in about 3 minutes. This is done when parts are small and easily handled; it is also done for large, clad plates when you need unstabilized austenitic stainless claddings in the solution heat treated condition.

You can use air cooling for thin sections. For thicker sections, water spraying or water bath quenching must be used.

Although these techniques impart ductility to the stainless clad layer, they also produce varying degrees of hard martensite in the steel backing. This depends on the carbon content, which should not exceed 0.15 pct.

**How About 17-7 PH?**—Precipitation-hardening stainless steels are used primarily in the aircraft, missile, and petroleum industries. The reasons for this choice are their strength, hardness, abrasion resistance, and corrosion resistance.

In the case of 17-7 PH stainless, clad on low carbon steel, compro-



**NO LOSS IN PROPERTIES:** Heat treatment can give ductility to clad titanium without a loss of strength in the carbon steel base plate.

mise heat treatments can become complicated. For example, the clad material can be put into the mill annealed condition either during the cladding process or subsequent to the cladding process.

The precipitation-hardening treatment is as follows: Heat the annealed clad plate to 1750°F, then air cool to ambient temperatures. Next, keep it at -100°F to complete transformation. Finally, heat at 950°F for hardening.

**Nickel Alloys Unaffected**—Materials such as Monel, and Inconel are relatively unaffected by heat treatments intended to improve the properties of the steel backing layer. Grain growth in the nickel and nickel alloys occurs at higher temperatures.

However, tests indicate that an increasing grain size has little relation to the corrosion resistance of the high nickel alloy clad layers in commonly used corrosive media. But grain growth can cause a slight softening effect in the high nickel alloy layers. And after very high temperature heating, an "orange peel" surface forms on high angle bends.

As in treating unclad high nickel alloys, you must take the precautions against sulphurous furnace atmospheres and sulfur containing compounds on the clad surface.

**Use Low Carbon Hastelloys**—Hastelloy alloys B, C, and F, clad on low carbon steels, present heat-treating problems. How can we obtain the desired properties in the clad layer and in the base steel?

These problems are similar to those encountered with austenitic stainless steels. That is, the treatment for optimum physical properties in the steel plate (normalizing) results in carbide precipitation and lower corrosion resistance in the Hastelloy clad layers.

You can resolve this problem by using vacuum melted extra low carbon Hastelloys, with carbon contents ranging from 0.010–0.030 pct. The composite clad plate can be normalized at 1600°F and the fabricated structure can be stress relieved in the 1100°–1200°F range. This imparts optimum physical properties in the steel without lowering corrosion-resistance in the clad layer.

Other more unusual wrought clad metal combinations have been produced. Still others are being developed, for new petro-chemical, chemical, nuclear, jet, and missile applications.

**Clad Noble Metals** — Noble metals can also be clad to steels. As a rule, normal heat treatments for the base metals have little effect

on the properties of the precious metals. Therefore, the best heat treatment is one which imparts the best physical properties to the strength-giving base metals. But take care not to overheat the noble clad layers.

For silver claddings, cut down the sulfur content of the heat-treat furnace atmosphere to prevent reactions. Hydrogen or vacuum is preferred as a furnace atmosphere when heat treating. Either one prevents oxygen diffusion into the silver at high temperatures.

Oxidizing atmospheres, however, are preferred to preserve the purity of the platinum surface.

**Protect Refractory Metals**—Refractory metals are difficult to clad. They require individual heat treatments; these depend partly on the physical and metallurgical traits of the base material.

Close atmosphere control is one critical factor which must be rigidly observed. Refractory metals rapidly oxidize and embrittle by contact with small amounts of atmospheric gases, during treatments above 800°F. Therefore, these clad plates must be treated under high purity inert gases, vacuum, or some other method.

Consider refractory metals clad to the more common base metals, such as low carbon steels, high nickel alloys, or stainless steels. The composite can, in most instances, be given the heat treatment required for the base metal.

**Retain Titanium's Ductility**—Titanium and zirconium should also be similarly protected against atmospheric gases during heat treatment to retain ductility.

The annealing temperature range for titanium and zirconium (1100°–1200°F) coincides with the stress relief temperature for low carbon steels. Therefore, when heat treating these composite clad plates, optimum ductility can be given to the cladding layer without much loss in strength in the carbon steel plate.

# Electro-Gun Ups Paint Mileage

**You can do low-cost quality painting with simple equipment.**

**One company electrostatic-paints its entire line with a hand spray gun.**

■ A company which relies on a quality finish on its products has found a simple, low-cost way to stretch paint "mileage." It improves the quality of the job as well.

Peabody Seating Company, Inc., of North Manchester, Ind., a manufacturer of school furniture, made these gains by using the electrostatic painting process in the form of a simple hand spray gun.

General foreman Jim Johnson reports that where they were painting 63 chairs per gallon by the time-honored dip method, they now get 160 chairs to the gallon, and a better job to boot.

**How It's Done** — Metal chair

frames go from fabricating to an overhead conveyor and through a four-stage wash, dry off, and go into a forced-air drying oven.

Then they travel at 14 fpm past the operator, who works them over with a Ransburg No. 2 process electrostatic hand gun.

After painting, they bake out at 350°F in a gas-fired oven, cool off, and go to inspection. From there they go to assembly, where they receive seats, backs, and leg glides and are ready for shipping.

**The Process** — The electrostatic painting process has already proved itself in numerous applications. It gives excellent finishes, saves paint, and is good at getting paint into hard-to-reach places.

It employs a system to charge paint spray to a high potential, and to charge articles to be coated to the opposite polarity.

Then, by attraction of oppositely

charged objects, paint is literally pulled onto all parts of the object being painted, including cavities and irregular contours.

**Ideal Method** — Electro-spray, by its very nature, has a wrap-around feature that suits it perfectly to Peabody's work, where tubular construction predominates. A chair leg, for instance, is painted uniformly from only one side.

The old process was wasteful because it was painting both inside and outside of tubular material, and because a lot of paint was being lost by dripping. There was also difficulty with paint runs, and consequent rejects. The electrostatic method cured both of these troubles in a hurry.

Whereas electrostatic painting is frequently performed using automatic equipment, Peabody's experience shows that for certain jobs less elaborate equipment is quite well suited.



**CLEAN AND EASY:** Electrostatic spray is pulled onto work, wraps itself around tubular parts like these.

# Superalloy Machining Gets Boost From Cavity-Sinking Setup

**It takes a lot of machine to form the high-temperature alloys used in missiles and jet engines.**

**And this unit could be just what the program needs.**

■ A new approach to the tough task of drilling into the surfaces of superalloys should ease many machining problems. In principle, this method borrows from the electroplating process, only in reverse.

Because the new technique doesn't rely on high temperatures

for its effect, there's no heat damage to metals. Unlike the electro-discharge method, there are no sparks or arcs.

The process operates on the electrolytic metal-removal principle. And the equipment to do the work is a product of Anocut Engineering Co., Chicago.

A direct current flows between the workpiece and the electrode through a water-base electrolyte solution. At the same time, metal is removed from the workpiece.

**Good Comparison**—In a recent demonstration of the equipment, the machine was compared with an or-

inary power drill. After five minutes of drilling, the power tool only created a tiny, polished surface on the material. Electrolytic machining, on the other hand, penetrated the same material at a rate of over 1¼ ipm.

This new unit compares favorably with the machine demonstrated by the Russians last summer in New York. The Anocut machine removes metal faster than the Soviet unit, and it does it without generating heat. In addition, there's no tool wear. The high temperatures incurred by the Russian machine often caused the work to melt.

Formerly, electrolytic machining had only been applied with rotating wheels. That limited its use to the same areas as conventional machining and grinding. But the new non-rotating electrode simply plunges linearly into the work material.

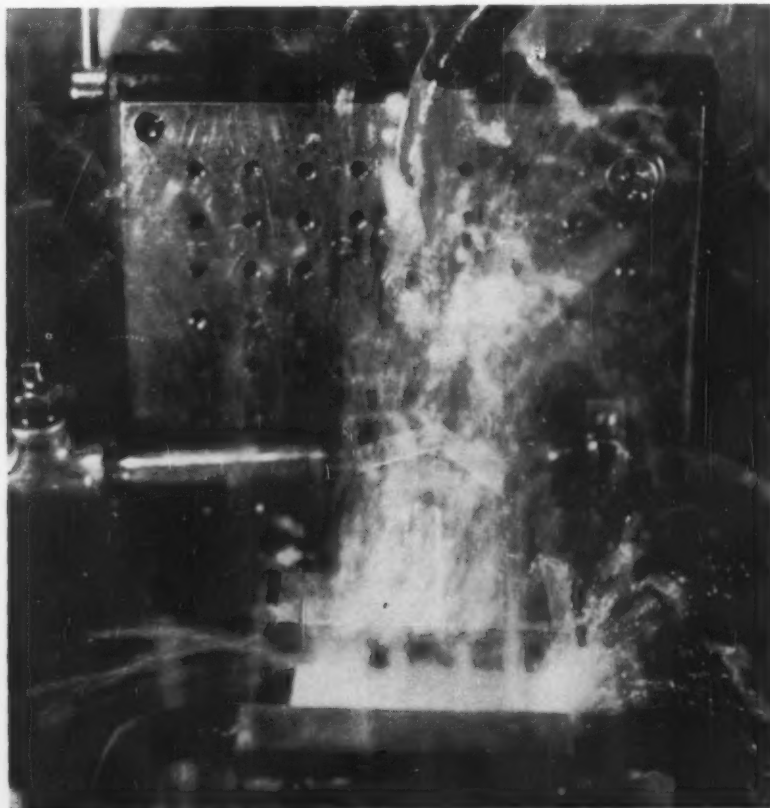
**Productive Tool**—The new process differs from electro-discharge setups in three main respects. First, it maintains much higher removal rates.

It can also center itself on small areas. Lastly, the electrode does not wear. As a result, it's more useful for production work.

By following the contour of an electrode, the process succeeds in sinking irregular holes and shapes. It can drill such tough metals as Rene 41, Incoloy, and several Stellite and Udimet grades.

**Power Supply**—Removal rate depends on the capacity of the power supply unit. It varies from 0.030 to 0.300 cu in. per minute. Anocut turns out standard units in 300, 600, 1000, 1500, and 3000-amp capacities.

Since you can mount more than one electrode for a specific job, it's possible to draw enough power from



**BITES INTO SUPERALLOYS:** Knife-type electrode cuts 0.075-in. wide slot, 3 in. long, in high-temperature alloy. Splatter is caused by flow of saline electrolyte through electrode and back along its sides.

a 1000-amp source to run five electrodes at once.

**Finer Finishes** — Finishes will vary too. On most materials, you can get a finish better than 30 to 40 microinches. And you can get a finish better than 20 microinches on the superalloys.

Usually it only takes one operation to make a finished piece. Why? Because an optimum finish is obtained at maximum removal rates.

Anocut Model HCS-59 is an electrolytic cavity sinker. The driving motion of the electrode is in a horizontal plane. Mechanical equipment as well as equipment to supply the electrolyte, are included in the package. However, the power supply and a mist collector are optional.

**Advances the Electrode** — The basic tools are a drivehead for advancing the electrode into the work and a electrolyte supply system. The latter includes a tank, pump, and filter.

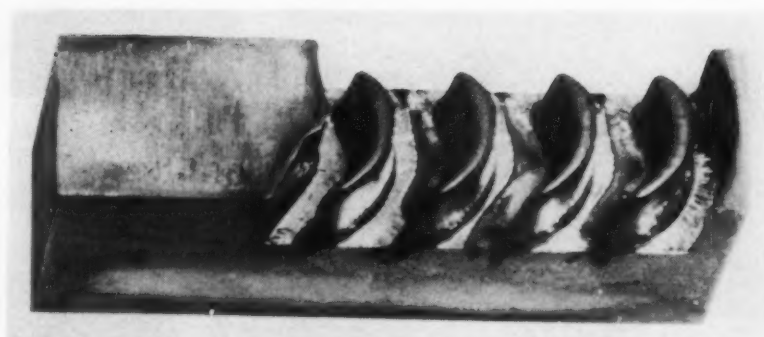
The drivehead consists of two heavy castings. The lower one contains linear ball bearings and a screw drive, both for the ram. There's a sensible feature to the upper casting. It's fitted with an easy-to-remove cover that gives access to all working parts.

A mechanical speed-reducing device drives the ram. If needed, this device can be adjusted by hand. Any changes from normal driving speeds to high-speed motion are made by electric clutches.

**Protects System**—Since the castings are gasketed and bolted, there's little chance of electrolyte entering the drivehead system. Also, the ram is covered with a neoprene boot, sealed at both ends.

The ram has a maximum stroke of 8 in. in the horizontal direction. A graduated hand wheel can adjust the ram as much as 6 in. The ram's working speed varies from zero up to  $\frac{3}{4}$  ipm. Its high speed movement for rapid traverse can reach 7.5 ipm.

An 8-in. dial indicator shows the position of the ram at all times. The worktable measures 18 x 18 in. The enclosure is 24 in. high, 41 in. long, and 28 in. deep.



**FORMS TURBINE BLADES:** Cavity-sinking machine forms turbine blades from Udimet 500 material in one operation. They're used for rocket motors.



**PREVENTS SPLATTER:** Plastic enclosure of work area prevents electrolyte splatter. Drivehead mechanism is left of cavity-sinking unit.

**Other Parts**—A pressure pump, filter and tank, all made of stainless steel, are also provided. Stainless valves and gages come with the system. And all plumbing connections are already made. You can disconnect the couplings easily whenever you want to remove the tank or filter assembly.

Controls include valves and pressure gages as well as a temperature gage. The master control panels houses electrical controls for the pump and electrolyte heater.

To guard against the effects of the electrolyte, all parts are made of stainless or chemical-resistant plastic. There are openings in the front, top and rear of the work area hous-

ing. This gives ready access for the mounting of work and electrodes.

**Table for Mounting**—To mount the work, a worktable is provided with T-slots and locating keyways. There are also a number of holes on the electrode holder. Thus, you can mount any type of electrode or electrode holder.

The push-button controls operate at 110-v potential. These moisture-proof parts comply in themselves and in their wiring with the standards of the National Machine Tool Builders Assn. The power supply is hooked up for 3-phase, 60-cycle current. Voltage, whether 220 or 440 v, must be specified.



**IMPROVING PROPERTIES:** Sleeve bearings move into a heat-treating furnace to obtain the new proper-

ties required for end use. There are now 25 grades of materials. This lends freedom to bearing design.

## Blend Powdered Metals to Get Longer Bearing Life

**Are you getting optimum mileage from your bearings?**

**Although design is important, no single factor will give better service than the material itself.**

■ Certainly a neglected aspect of the sintered-bearings picture is the subject of materials. Yet, this is the most important part of the process—deciding which basic metal powders should be used. Also their exact proportions.

For years, this was done by choosing materials on the basis of broad industrial needs. Today's specs have remained virtually unchanged for two decades. They don't cover special blends, or some of the new powders of the past 10 years.

**Variety at Low Cost**—The sintered bearing manufacturer is now able to provide low-cost bearings for any use.

This is possible because the bearing maker has access to these new materials, and can vary density of the compact, sintering procedures, lubricant content and the properties of the lube itself. Bound Brook Oil-Less Bearing Co., Bound Brook, N. J., does just that—tailors the bearings to their end use.

It's surprising, in light of this new design freedom, how many engineers and purchasing agents still accept general purpose bearings that are far from ideal for the intended use.

In specifying sintered bearing materials, the designer has about 25 grades from which to choose.

His choice will depend, of course, on the requirements of his application. It will also be influenced by cost.

**Shaft Governs Type**—The motion of a shaft generates heat on a bearing surface which, in turn, governs oil expansion and surface flow. Thus, the type of motion and speed of shaft rotation are important factors.

Torque acting on the shaft affects the speed with which oil will be drawn to the bearing surface. Low shaft speeds (those lower than 25 fpm) generally call for a sintered material containing some dry lubricant.

As shaft speeds increase, higher oil content becomes more important. Why? Because oil is lost more

rapidly as higher heat begins to generate.

**How Much Density?**—High shaft speeds (from 50 to 250 fpm) call for lower density materials with maximum oil content. These are typified by the Bound Brook "H" and "Y" series, which contains from 26 to 35 pct oil by volume.

As loads increase, applications favor the higher density bronze materials, such as the standard 90-10 "H" series. This is the most widely used series with most standard sintered bearings produced in this range.

You can increase the strength of the bearing materials by replacing the bronze with iron. Bound Brook's Powdiron "P" series contain 90 pct Fe, and 10 pct Cu.

**Can Use Wicks**—Added oil supplies in the form of wick reservoirs are often useful. Where densities must be very high, such as 7.0 bronze, extra lubricant reservoirs are desirable.

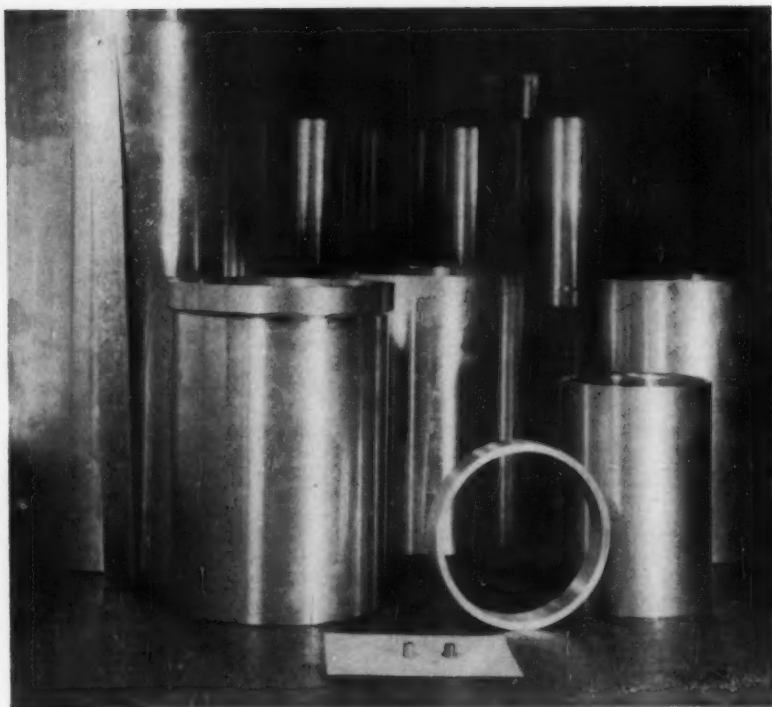
Reservoirs are also useful for many normal loads where the unit is sealed and expected to give long life. Household refrigerator units display this kind of service.

If shaft motion is intermittent, the oil film on the bearing surface will either subside into the bearing structure, or be wiped clean on the shaft's return to motion. This is where lubricating properties of the bearing material come into play.

**Combine Dry Lubricants**—To fill this need, special purpose materials such as Bound Brook's "R" series contain dry lubricants like special graphites and molybdenum disulfides. They also yield good amounts of oil.

The "R" series is also useful when the bearing must be molded or cast in place, instead of simply press fitted into a housing. For example, molten diecasting metal might well penetrate and block a normal porous bearing structure.

To prevent it, porosity must be as fine as possible. The "R" series will permit diecasting or molding



**PRECISION THROUGH EXPERIENCE:** Tiny Compo bearings in the foreground reflect today's engineering. The large ones are old timers.

in place without too much penetration of the bearing walls.

**For Noise Damping**—Today it's vital to suppress noise in products like hi-fi turntables, tape recorders, and recording equipment. This problem continues even with shaft tolerances as close as 0.0002 in., and bearing tolerances of 0.0003 in.

Use of "straight" or "standard" sintered materials, such as the average 90-10 bronze, doesn't stop it. To solve this problem, Bound Brook developed its "A" series of special bronze and graphite.

Generally speaking, bronze materials and their blends should be used in corrosion areas. Where iron materials are desired, either from a cost standpoint or because of their high-speed load carrying ability, impregnation with anti-oxidant lubricant is your best bet.

**To Check Corrosion**—Bronze materials in which iron is used as a filler to cut materials cost (as in the Bound Brook "E" series) resist mild attacks of corrosion.

When ordering these materials, make sure that the blending and sintering methods will yield a bronze bearing surface. At the same time, they should retain particles within the bearing as filler.

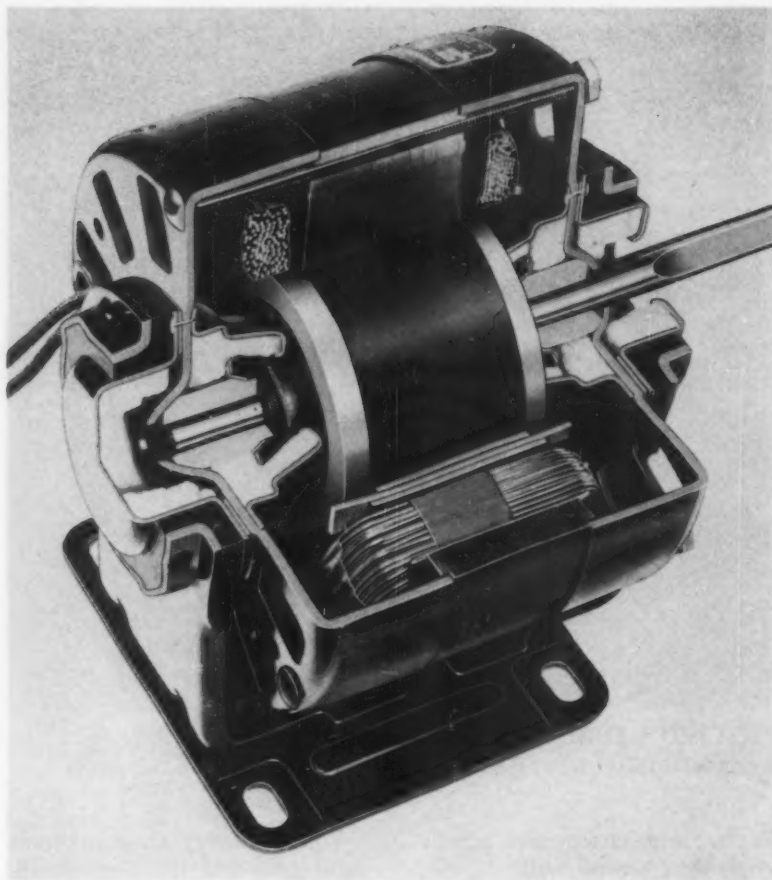
When designing for shock resistance, take a close look at the irons. The shock and load properties of Bound Brook's "P" series are like the high density sintered bronzes.

For farm machinery, wheel bearings and machine-tool uses, the "P" series of sintered irons provide suitable bearings at lower cost than the bronzes.

**Free-Machining Iron**—A recent factor which has increased the use of iron materials for bearings in Bound Brook's development of "FM", or free-machining, iron. This sintered material can be cut rapidly and finished smoothly in about the same way as mild steel.

"FM" iron fits into jobs requiring complex bearing shapes. Until now, these were made only of ductile, free-machining bronze materials like Bound Brook's "Q" series.

Of course, it's always desirable



**RETAINS OIL:** Self-aligning bearings with wicking to hold oil make it possible to put motors in inaccessible areas, like refrigeration units.

to have as much lubricant in the bearing pores as design will allow. In fact, engineering of the material and bearing fabrication should aim at this goal.

Toward this end, insist on vacuum impregnation. It insures that all air is exhausted from the pores of the finished bearing.

**Vacuum Helps**—In this way the hot oil will enter the bearing freely when it's immersed. Don't settle for mere soaking.

Housing and shaft design may influence the choice of bearing material. If the housing is normal cast iron, steel, aluminum or zinc base, almost any sintered bearing material can be selected.

If, for example, the bearing must be staked into a stamping, it may be necessary to pick a more ductile bearing material. Bound Brook's

"Q" series can be staked or spun in place.

**Select Shafting**—Almost all ordinary shafting is used with sintered materials. Common cold-rolled, hardened and ground, drill rod, and many alloy steels are used. You should avoid the austenitic stainless series, because the galling traits of such shaftings result in excessive wear and early failure.

Factors that affect cost of a sintered bearing can be broken down into two classes: materials and processing.

Although iron is a bit harder to process than bronze, the sintered bronzes are the most costly materials from an overall point of view. Cost of sintered bronze drops as iron is added for structural filler. Straight irons are the least costly.

**Stress Process Costs**—Materials

costs are an established fact. This makes them easy to find in the design stage. It's the cost of processing that eludes designers specifying a non-standard item.

Length of the production run heads the list. The sintered bearings process is really a long-run method.

Once you amortize initial tooling, the process makes for big savings over machining in labor and materials cost. It also offers dimensional control.

**Save With Standards**—Shape and dimensions of the bearings are the next most critical cost factors. Many types of sintered bearings in hundreds of sizes are offered as standard items for which tooling has already been made.

If you can design a unit to accept one of these standard items, you can bypass the most costly and time-consuming part of the process. It also spells savings where small numbers of bearings are needed.

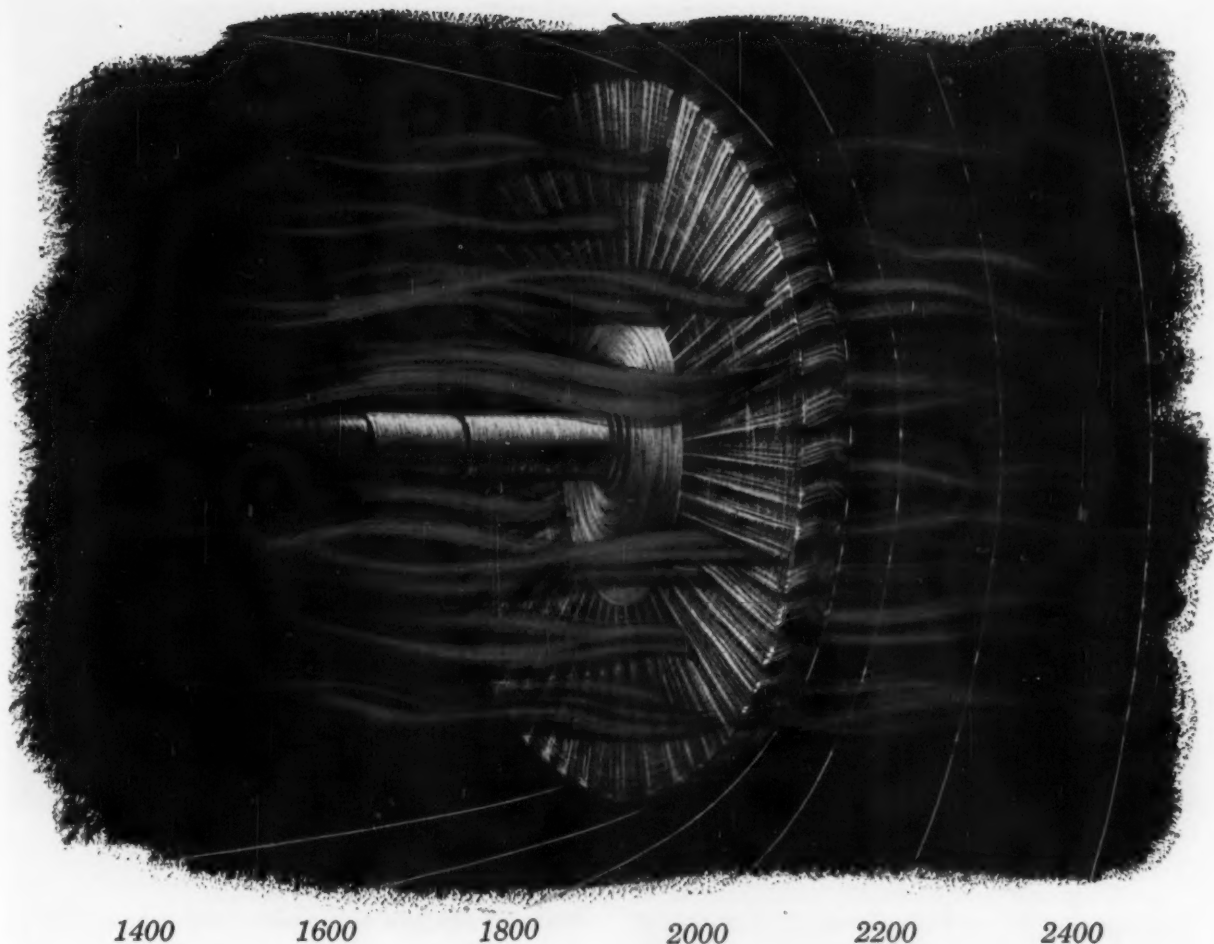
When non-standard bearing shapes are needed, try to design for processing ease. Remember that long, thin-walled shapes, or odd cross sections may receive special handling or require special tooling.

**Tolerances a Factor**—Tolerances are still another important cost factor. Manufacturers list "standard" tolerances to which their flanged and sleeve bearings can be made without special processing.

Tighter tolerances may mean more processing and tighter inspection all along the line. Added operations, such as machining of special shapes, will also boost processing costs.

Finally, the sintered bearing manufacturer includes in his standard prices provision for packaging finished bearings so that, during normal shipment, they'll remain "commercially free" of nicks and general damage.

When the customer requires that bearings arrive completely free of surface damage, special inspection, sorting and packaging methods must be used. And these, too, are reflected in final cost.



## *Boring into the Heat Barrier*



Heat-treating facilities are part of the complete metallurgical services available at Haynes Stellite Company.

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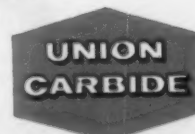
# **HAYNES**

## **ALLOYS**

**HAYNES STELLITE COMPANY**

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*far from  
under the  
spreading  
chestnut-*



## BETTER FORGING



**STAINLESS FORGING STEELS** of consistently uniform quality enable the skilled hammersmiths at Charles E. Larson & Sons, Inc., Chicago, Illinois, to produce high quality flat-die forgings for a wide variety of industries. Photo shows a 6000 pound hammer punching a hole in a 600 pound stainless steel blank. This forging, used in sonar equipment, will finish as a ring 33" outside diameter by 12" inside diameter by 2½" face.

Today's forging hammers wallop with tons (as much as 300). To give customers forged parts that will withstand severe torsion, tension, vibration, shock, and wear, forgers start with better forging quality steels.

They further improve the quality by the hammer blows or high pressure of the forging process.

As the nation's largest supplier of high quality forging steels—carbon, alloy, stainless, and forging quality titanium—Republic has paced the needs of the forging industry.

Republic combines quality control at every step of production with the most advanced features of bar mill design to meet today's requirements for high

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**FORGING QUALITY TITANIUM, TOO,** is supplied by Republic. In building missiles, rockets, aircraft, and aircraft engines, titanium forgings are playing an increasingly important part because of their exceptionally high strength/weight ratios. Companies such as the TAPCO Group, Thompson Ramo Wooldridge Inc., have gained extensive experience in development of special tooling and procedures to broaden the range of forged titanium parts. Photo shows contouring face of forged titanium rotor disc with tracer-controlled T-lathe at TRW's Structures Works.



**HOT ROLLED CARBON BARS** in a wide variety of chemistries round out the complete Republic Steel line of forging quality bars and billets. Uniform analysis and control of physical properties from mine to your plant assure unsurpassed workability and finished quality.

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quality forging bar products in a complete range of sizes, shapes, and materials.

Then, Republic goes a step further by providing the services of its famed 3-Dimension Metallurgical Teams—field, mill, and laboratory metallurgists. These specialists in carbon, alloy, stainless, and titanium work directly with the forger's personnel. They assist in selection, application, and processing of the right forging bar product for the job.

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**ALLOY FORGING STEEL** assures high-strength and dependability in top quality parts produced by the Palmer Tool & Forging Company, Meadville, Pennsylvania. The alloy used is Type 4140, delivered in hot rolled bars. Forgings of many intricate forms and sections are made on a job shop basis for a wide variety of end uses.

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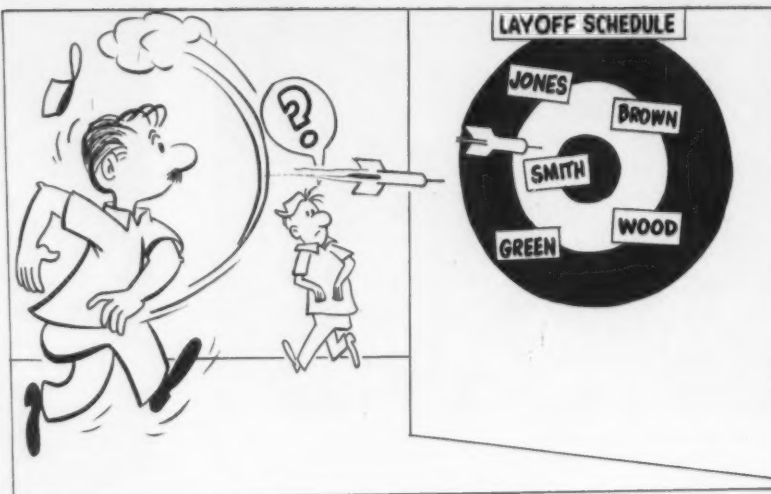
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## You Arbitrate It!

### SKIP THE TURKEY?

From the files of  
The American Arbitration Association

■ "The company may, in case of a shutdown of no more than two days' duration, lay off employees without regard to seniority."

That's what the contract read at a garden tools manufacturing company. It seemed clear enough until management decided to shut down a single operation for two days, Nov. 27 and 29, 1957. The 28th was Thanksgiving Day, and the whole plant was closed anyway, with employees paid for the holiday.

To the company, this was a two-day layoff, permitting seniority to be disregarded. But one of the em-

"You Arbitrate It!" appears in the second issue of *The IRON AGE* each month. Look for it in the December 10 issue.

ployees affected thought differently. "I was really out three days," he said. "The fact that I was paid for one of those days doesn't make any difference. It amounted to a layoff of more than two days, so you should have recognized my seniority and laid off a junior man."

"On the contrary," answered the plant superintendent. "A paid holiday is the same as a day worked, as far as the contract is concerned. We compute it that way in determining vacation and overtime pay. So why should absence on a holiday be regarded as a day on layoff?"

The matter couldn't be settled in grievance procedure, and so it finally went to an arbitrator under the rules of the American Arbitration Assn. **How would you rule?**

### The Arbitrator Ruled:

"The answer must be found in the purpose of the quoted clause. That purpose was, upon its face, to give the company two clear days of temporary inactivity within a department without the adjustment that seniority entails. To count a paid holiday, when the entire plant is inactive, as one of those two days appears to me to thwart the object of the paragraph."

**CAUTION:** The award in this case is not necessarily an indication of how arbitrators might rule in apparently similar disputes. Each case is decided on the basis of the particular history, contract, testimony and other facts involved. Some of these essential details may have been omitted in condensing the original arbitration for brief presentation.



# POP'S School of Sawing

AIN'T THEY THE MOST BEAUTIFUL TEETH YOU EVER SEEN?

THOUGHT FOR A MINUTE POP WAS TALKIN' TO SOME GIRL

NOPE...HE'S TALKIN' ABOUT NICHOLSON HACKSAW BLADES. AN' HE SURE DOES GET ENTHUSIASTIC ON THAT SUBJECT!



**NICHOLSON**

Welded Edge Shatterproof

It's time you got enthusiastic and tried Nicholson or Black Diamond hacksaw and band saw blades. You'll get favorable results...save metal cutting time and cost...increase production.

Other industrial blade purchasers and users have tried the Nicholson or Black Diamond brand. *They've had favorable results...judging by the way they're reordered.*

Look for the Nicholson or Black Diamond trademark the next time you buy blades. It's your guarantee of outstanding performance at a reasonable cost.

Selected distributors now offer the Nicholson or Black Diamond blade line. Ask for the types you use.

\* Industrial Distributors provide the finest goods and services in the least possible time. Our products are sold exclusively through them.

## NICHOLSON METAL SEPARATING BLADES ARE AVAILABLE IN THESE TYPES

### HAND HACKSAW BLADES

High Speed Steel	Standard Steel
Flexible High Speed Molybdenum	All Hard Standard
All Hard Molybdenum	Special Shatterproof
All Hard Tungsten	Flexible Standard

### POWER HACKSAW BLADES

Welded Edge Shatterproof	All Hard Molybdenum
Flexible High Speed Molybdenum Steel	All Hard Tungsten—18-4-1

### BAND SAW BLADES

Mugshot—Raker and Wavy Set • Hook Tooth • Ship Tooth



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## FREE TECHNICAL LITERATURE

# New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy just circle the number on the free postcard, p. 181.

### Wheel Former

A four-page bulletin describes a wheel-forming attachment for surface grinders which form-trues complex grinding-wheel contours accurate to tenths in minutes. It operates by traversing a tracer over the profile of an easily prepared template. (Pratt & Whitney Co., Inc.)

For free copy circle No. 1 on postcard, p. 181

### Hydraulic Jet Cleaners

A four-page bulletin presents a complete line of hydraulic jet plant- and tank-cleaning equipment. (Sellers Injector Corp.)

For free copy circle No. 2 on postcard, p. 181

### Welders

A 12-page bulletin gives condensed specifications on a complete line of welders. Transformer, rectifier, and rotary dc welders are included, along with a number of accessory controls. (Harnischfeger Corp.)

For free copy circle No. 3 on postcard, p. 181

### Form Grinder

A four-page brochure describes an automatic form grinder for high-production, precision plunge grinding on shaft work up to 31 in. long. It is also adaptable for other between-centers work, chucking work,

and jobs requiring external, shoe-type support. (Jones & Lamson Machine Co.)

For free copy circle No. 4 on postcard, p. 181

### Recording Pyrometer

A three-page reprint of a journal article describes a recording optical pyrometer which measures the brightness temperature at 0.65 microns of a small incandescent sample in the range of 1300° to 3000°C with a time constant of a few milliseconds. (George A. Philbrick Researches, Inc.)

For free copy circle No. 5 on postcard, p. 181

### Control Centers

A 16-page bulletin illustrates the advantages of adaptability of a line of modular ac motor-control centers. "Plan-it-yourself" forms and instructions are included. (Clark Controller Co.)

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### Electric Resistors

A four-page bulletin describes a line of tab-welded resistors, featuring minimum maintenance. A selection table covers ratings from 13 to 500 amp for various section lengths. (The Electric Controller & Mfg. Co., Div. of Square D Co.)

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### Circuit Breakers

A chart includes information on a complete line of circuit breakers. It enables selection of the proper breaker for each application. (Westinghouse Electric Corp.)

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*"The difference is almost invisible"*



*...but it saved us nearly \$20,000"*

Royal McBee had been using solid rivets and a staking machine to put together an assembly for their Royal electric typewriter. Lots of hand operations, lots of chances for scrap-making fumbles. Still, production costs were satisfactory . . . until suddenly the production rate had to be almost doubled. Costs really jumped.

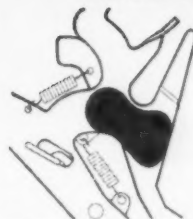
Their TRS man suggested dropping solid rivets for semi-tubular ones, automatically machine-fed and set, with a special TRS-designed loading fixture to fumble-proof the whole operation. Result: the increased number of perfect assemblies a day . . . with the same operating crew using standard TRS riveters already available at Royal McBee.

Let the TRS man look over your assemblies. You'll find that he has the viewpoint of a manufacturing engineer, and an unusual knack for making fastening simpler, faster, better.

Of course he will recommend TRS rivets. But he will give you sensible reasons why they are more reliable in essential qualities and uniformity. Superior Quality Control is one significant result of a five-year modernization of this pioneer company. Modernization of people, policies, production and service facilities. *You'll like to do business with the new TRS . . . we'll make sure of it.*

*Don't Buy Riveting Machines until you learn how the TRS PAR process revolutionizes riveting*

#### THE CHANGE THE TRS MAN MADE



OLD

Two operators assembled 2 solid rivets and 1 shouldered stud into countersunk holes of trip pawl, placed this on a tray, then placed carrier arm over stud. Third operator positioned bearing plate over rivets and stud, lifted the loose assembly from the tray and slid it under a staking machine to stake the 2 rivets.



NEW

The countersink is eliminated, in all three locations. On the special TRS sliding fixture, each operator assembles all components over 2 locating pins, with the stud in place. The loaded fixture is then slid into riveting position, and the riveter is actuated by a foot lever to fasten the assembly with 2 semi-tubular rivets.

# TRS

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QUINCY 70, MASSACHUSETTS • TRS SALES OFFICES: Atlanta • Buffalo • Charlotte • Chicago • Cleveland • Dallas • Detroit • Hartford • Indianapolis • Los Angeles • New York • Philadelphia • Pittsfield • Quincy • St. Louis • Seattle. WAREHOUSE IN CHICAGO  
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*If it's a Tubular Rivet TRS makes it . . . and Better*





**R. Hoe reports high machining speeds, consistently smooth finish**

## **GULF MAKES THINGS RU**

As the world's largest manufacturer of printing press equipment, R. Hoe & Co., Inc., New York, N. Y., does an enormous volume of precision machining. The company operates some 2,100 machine tools at plants in New York City and in Dunellen, New Jersey.

John Penberthy, Plant Maintenance Superintendent, reports that selection of the proper cutting oils for their thousands of machining operations is no small problem. But he quickly explains how they've solved it.

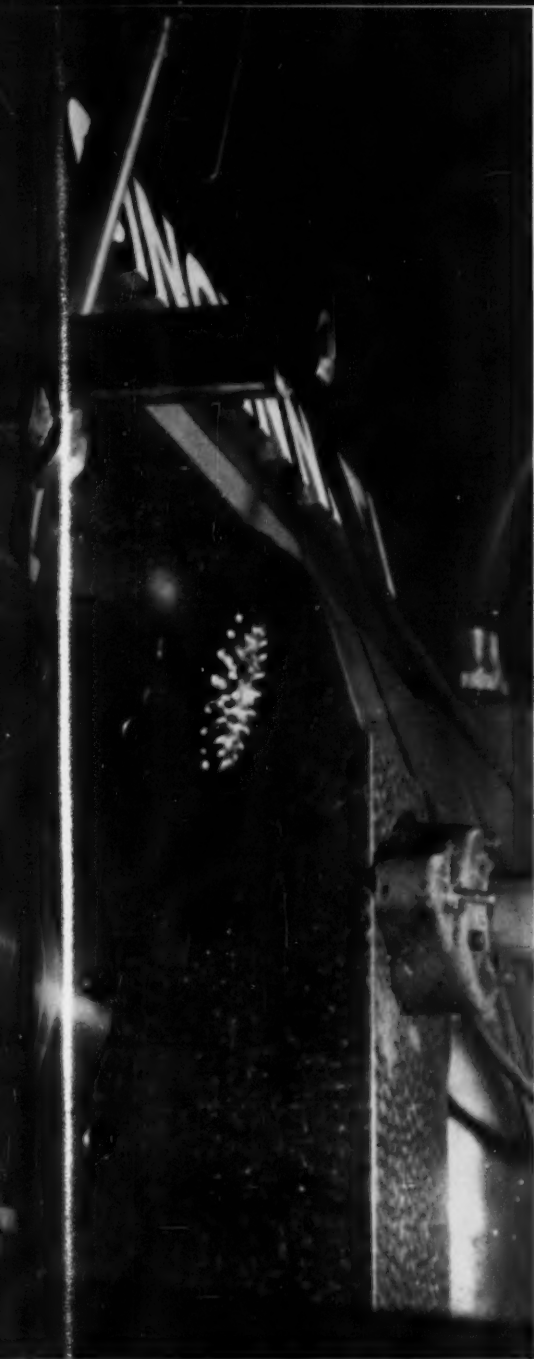
"We consider ourselves experts at printing press design and construction, rather than cutting oil special-

ists," says Mr. Penberthy. "That's why we have used Gulf engineering service and Gulfcut oils for more than 15 years to help us with our machining problems—especially those involving high speed, high temperature cutting.

"For example, in the high-speed milling of shafts, gears, pinions and other close-tolerance parts for our presses, Gulfcut 41C allows us to machine the pieces faster, without sharply reducing tool life. At the same time it helps us get a smooth finish that eliminates the need for many follow-up grinding operations."

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**GULF OIL**  
Department  
Pittsburgh 3



Erection shop at R. Hoe & Co., Inc., where their printing presses are pre-assembled for testing before shipment. One of the new high-speed Hoe presses can print 70,000 newspaper pages per hour—in color.



Under the nameplate that identifies the oldest and biggest name in printing press manufacture are John Penberthy, left, Plant Maintenance Superintendent, and C. J. Ramsey, Gulf Sales Engineer. For their huge volume of precision machining, Hoe has relied on Gulfcut oils and Gulf service for over 15 years.

h finishes, using Gulfcut . . .

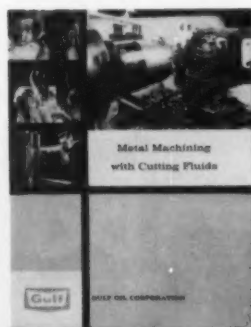
# 6 RUN BETTER!

That's just one of many ways in which Gulf makes things run better for R. Hoe & Co., Inc. Perhaps a Gulf Sales Engineer can help improve *your* machining practices, too. Just call the nearest Gulf office.

**GULF OIL CORPORATION**  
Department DM, Gulf Building  
Pittsburgh 30, Pa.



**NEW 100-PAGE MANUAL** tells all about cutting oil selection and usage. Send for your free copy of "Metal Machining with Cutting Fluids."





Through this Type ZA-29 Zyglo Unit, parts flow in a 5-step inspection, beginning with application of penetrant at extreme left, and ending with inspection under black light at the right.

## Inspection Pays Off in Consistent Quality of Magnesium Castings

Magnaflux' Zyglo Also Reduces Scrap and Waste at the Magnesium Alloy Products Co.

If a typical, progressive foundryman could hang just one motto on the wall, it would probably be, "Aim for Consistent Quality". He doesn't mean "perfection"—he means that every casting produced should be job-worthy for its purpose.

The Magnesium Alloy Products Co., of Compton, California, is a good example of what such an aim can accomplish. Through modern processes and a well planned inspection system centering around Zyglo Fluorescent Penetrant Inspection, it has achieved high consistent quality, while reducing scrap losses and waste.

"To prevent excessive scrap from occurring," explains L. M. Nash, Metallurgist for the company, "it is necessary for the inspection department to catch a faulty casting as soon

as possible—first, to isolate it so that no further labor or time will be wasted on it; and second so that the quality control department can make corrections before too many castings are poured.

"An average molder with an average squeezer pattern will produce about six molds an hour. The pouring, cooling and shakeout will require about 30 minutes, so that by the time the first casting reaches the first or 'hot inspection' there are probably four to six molds already made.

"If this casting contains a flaw that is not seen by the inspector, it may be several hours before the trouble is found at a later inspection point. It is therefore vitally important that the inspection department be given every

facility needed to locate trouble spots as soon as possible.

"The defects we look for with fluorescent penetrant inspection are cold shuts, cracks, blows, shrinkage, and dross.

"Zyglo inspection has many advantages to fit our inspection needs at Magnesium Alloy Products Co. The cost of material used per casting is low and the process fast enough to keep up with production and give us quick and accurate answers. And there is no objectionable residue left on the castings to interfere with subsequent operations.

"The final big advantage to us, of course, is that besides reducing scrap, lost time and waste, we are now able to turn out a better quality casting."

**FOR YOU, TOO—Magnaflux Test Systems can help to increase the yield of usable castings — and foundry profits! See your MX Engineer or write for details**

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CASE HISTORY No. 56-8

Reprinted from **Magnaflux** Vol. 4, No. 2

### FOUNDRY

- Magnesium Castings
- Insuring Consistent Quality
- Reducing Scrap and Waste



Shrinkage porosity in a magnesium casting as revealed by Zyglo. Finding the cause helps provide the cure.

THE HALLMARK  
OF QUALITY IN  
NONDESTRUCTIVE  
TEST SYSTEMS



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## FREE LITERATURE

Continued

These publications describe money-saving equipment and services . . . they are free with no obligation . . . just circle the number and mail the postcard.

### Servoalve

A catalog describes a mechanical-feedback electrohydraulic servo-valve. It features small size and high performance, with rated flows of 1, 2, 4, or 8 gpm at 1000-psi valve drop. (Moog Servocontrols, Inc.)

For free copy circle No. 9 on postcard

### Turret Drills

An attractively illustrated 20-page bulletin sets forth the principles and advantages of turret drilling, and presents case histories concerning a line of turret drills. (Brown & Sharpe Mfg. Co.)

For free copy circle No. 10 on postcard

### Ultrasonic Cleaning

A four-page service bulletin describes the ultrasonic cleaning process and offers six helpful pointers on operation. (Oakite Products, Inc.)

For free copy circle No. 11 on postcard

### Facilities Brochure

A pack of pamphlets detail a company's facilities for casting, machining, heat-treating, fabrication, and manufacturing. In addition, the line of standard finished products of the company is illustrated. (Omaha Steel Works)

For free copy circle No. 12 on postcard

### "Ring of the Future"

The "ring" is the feedback-based loop of process control. The "future" is self-explanatory. This is the phrase used by one company to suggest the evolutionary nature of automation. It is part of a program to encourage the metal-rolling

and processing industry to automate and better control and program its production through a logical step-by-step program of modernization, using products already proved and reliable. A packet of charts and brochures explains the concept and describes a line of equipment to implement it. (General Electric Co.)

For free copy circle No. 13 on postcard

### Granulators

Two types of granulator are described in a four-page bulletin. One is a high-production vertical mill for powder metals and many other materials. The other is an oscillating model recommended for friable and other "problem" materials. (F. J. Stokes Corp.)

For free copy circle No. 14 on postcard

### High-Strength Bolts

A four-page bulletin gives complete data on a new line of aircraft bolts rated up to 290,000 psi. They feature cadmium plating to prevent hydrogen embrittlement, threads rolled after heating, and small, lightweight, 12-point heads. They come in sizes from #10 through 7/8 in. (Standard Pressed Steel Co.)

For free copy circle No. 15 on postcard

### Maintenance Ideas

A four-page folder lists numerous helpful applications of a line of chemical products for use in various maintenance jobs. They include high-speed and high-temperature lubricants, solvents, and protective coatings. (Kano Laboratories)

For free copy circle No. 16 on postcard

### Centrifugal Compressors

Three styles of single-stage scroll casing compressors are described in a 12-page brochure. (Allis-Chalmers Mfg. Co.)

For free copy circle No. 17 on postcard

### Stainless Steel Chart

A data chart compares properties of 18 grades of stainless steel, including precipitation-hardening grades 17-4 and 17-7. It compares

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## FREE LITERATURE

tensile strength, yield, Izod, creep, machinability, thermal conductivity, scaling resistance, thermal expansion, and relative base prices. A corrosion-resistance table is included. (Peter A. Frasse & Co., Inc.)

For free copy circle No. 18 on postcard

## Contour Band Saws

An eight-page catalog describes heavy-duty contour band machines in four models. They are illustrated performing typical work. These machines are particularly recommended for toolroom and maintenance work involving heavy work schedules and tough cutting jobs. Included are descriptions of accessories to facilitate sawing of contours of all kinds. (The DoALL Co.)

For free copy circle No. 19 on postcard

## Test Instruments

A 48-page catalog describes and specifies a complete line of instruments for scientific measurement, recording, and testing. (Minneapolis-Honeywell Regulator Co.)

For free copy circle No. 20 on postcard

## Facilities Brochure

An attractive 10-page brochure describes a company's engineering facilities in the field of control of shock, vibration, and noise. (Write on letterhead to Barry Controls, Inc., 700 Pleasant St., Watertown 72, Mass.)

## Ovens

A comprehensive reference catalog gives detailed information on a complete line of laboratory, pilot-plant, and small batch-type production ovens. (Despatch Oven Co.)

For free copy circle No. 21 on postcard

## Hydraulic Presses

Product bulletins describe a line of multiple-station hydraulic presses for rubber, plastic, and ceramic forming; a 700-ton double-acting

hydraulic press; and a 12,000-lb off-setting machine for axle-bending. (Allied Engineering & Production Corp.)

For free copy circle No. 22 on postcard

## Flux Guide

A technical data sheet offers technical bulletins which deal in detail with specific problems in the use of soldering fluxes. A solder selector chart is included. (Alpha Metals, Inc.)

For free copy circle No. 23 on postcard

## Giant Extrusion Press

A bulletin describes the capabilities of a 13,200-ton extrusion press for magnesium, and comparable in size to any press now in use for aluminum. It makes possible longer, larger aluminum and magnesium extrusions with resultant savings in weight and fabrication costs. (The Dow Metal Products Co.)

For free copy circle No. 24 on postcard

## New Tool Steel

An eight-page bulletin describes UHB Premo, a low-carbon tool steel with workability and wear-resistance properties that suit it well for molds for plastics and diecasting dies for zinc and other low-melting-point metals. Detailed machining information is included. (The Uddeholm Co. of America)

For free copy circle No. 25 on postcard

## Finishing Equipment

A four-page pamphlet illustrates a complete line of finishing and painting systems. Included are spray guns, spray and dip coaters, ovens, booths, air compressors, hose, connections, phosphating systems, and other equipment. (The DeVilbiss Co.)

For free copy circle No. 26 on postcard

## Pickling Compounds

A four-page bulletin describes powdered pickling compounds for various uses. Advantages of the powder form are discussed. (Friedrick Gumm Chemical Co., Inc.)

For free copy circle No. 27 on postcard

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# STAINLESS STEEL

- **Quick Deliveries**
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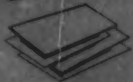
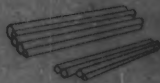








Since we stock all the principal corrosion resistant metals—Aluminum, Brass, Bronze, Clad Metals, Copper, Monel, Inconel and Plastics, too—we can and do give unbiased opinions on the right material to do the job. Anytime you need anything in the corrosion resistant line, you'll find it pays to call Whitehead first. Write for a free copy of our Stainless Steel Stock List.

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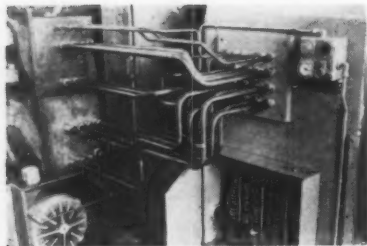
303 WEST 10th STREET, NEW YORK 14, N. Y.

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# New Materials and Components

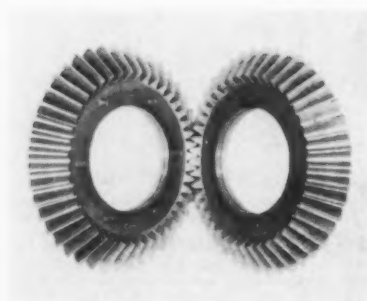


## Welded Tubing Saves in Hydraulic-Line Uses

Cold-drawn welded hydraulic-fluid-line tubing is from 20 to 30 pct less expensive than J.I.C.-approved seamless tubing, and has been approved by J.I.C. for hydraulic use. It bends and flares easily and uniformly, and every

length is hydrostatically tested. It is available in sizes from 1/4- to 1 1/4-in. diam, with wall thicknesses from 13 to 20 gage, and is identified by a blue spiral mark along its length. (Joseph T. Ryerson & Son, Inc.)

For more data circle No. 28 on postcard, p. 181

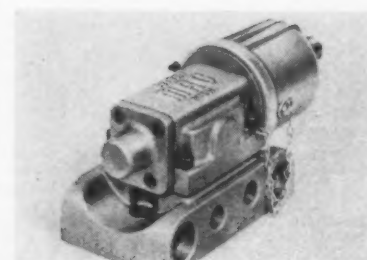


## Spheroid Bevel Gears Feature New Tooth Design

A new line of spheroid bevel gears is designed for all types of bevel-gear applications. These multi-contact, full-fillet gears have a minimum of two teeth in contact at all times, providing for increased load capacity and smooth, quiet operation. Uniform tooth loading avoids concentrated stress, mini-

mizes backlash, and permits carrying heavier loads at higher speeds without scoring. True involute form insures part uniformity and makes gears interchangeable. They are available in two hardnesses, in standard ratios and pitch diameters. (Braun Gear Co.)

For more data circle No. 29 on postcard, p. 181

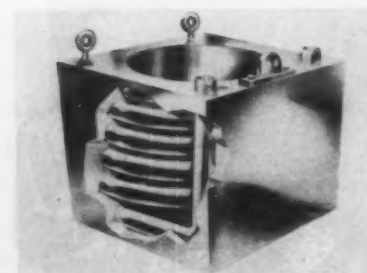


## Compact Air Valves Require No Accessories

Using simple, rugged, and reliable solenoids, new air valves are highly versatile. They come in single- and double-solenoid 4-way, 3-way, and 4-way 5-port types in 1/4, 3/8, and 1/2-in. sizes, with pre-wired bodies and bases. The body

simply plugs into the base. Besides operating automatically, they can be operated by manual screwdriver or ball-type operators, included as standard for ease of setup, etc. (Mechanical Air Controls)

For more data circle No. 30 on postcard, p. 181



## Roof Coolers Have Long Life, No Corrosion

Roof cooler blocks for entry of oxygen lances into open hearths have maximum life and freedom from corrosion. Superior cooling efficiency comes from a design in which high-conductivity copper tubing is cast directly into a high-conductivity copper block. Use of se-

lected materials gives maximum heat transfer and insures resistance to corrosive effects of steel-mill water. Cast copper is electrolytic grade, with a minimum conductivity of 95 pct I.A.C.S. (Philadelphia Bronze & Brass Corp.)

For more data circle No. 31 on postcard, p. 181

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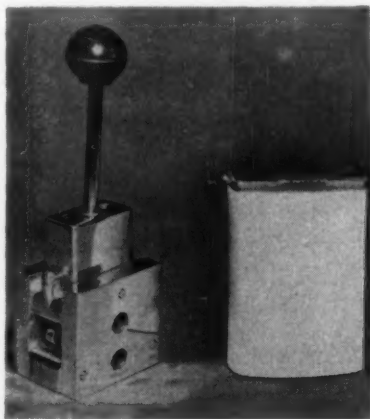
## Parting Powder

Used to part core and molding sand for all metals, a new non-silica parting powder is more economical to use because it weighs nearly 60 pct less than similar products and is bought by weight. It is water-proofed and extremely fine, and adheres even to vertical surfaces of core boxes and patterns of all materials. It is good for sand-to-sand parting, drawing carbon-dioxide cores, and hot sand. It is especially useful where boxes and patterns have little draft, or where the sand is sticky. (Frederic B. Stevens, Inc.)

For more data circle No. 32 on postcard, p. 181

## Versatile Valve

A miniature valve is capable of performing the same work as current valves five times its size and weight, and can be used interchangeably as pneumatic, hydraulic, or vacuum valve. Manufactured in three sizes, it is priced lower than



valves of comparable capacity. Basically a compound poppet valve, it can, by substitution of small parts, cover an operating range from 28-in.-Hg vacuum to 1500 psi. The body is diecast aluminum. (The Gabriel Co.)

For more data circle No. 33 on postcard, p. 181

## Goggle Valves

New thermal-expansion goggle valves are designed for use on the large gas line between dustcatcher and gas washer on high-pressure blast furnaces. They have parabolic silicone rubber seats, which are pro-

# ALLEN

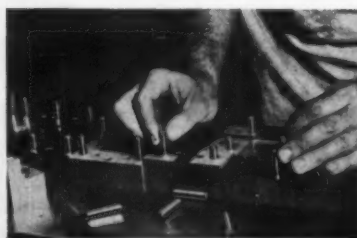


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Your ALLEN Industrial Distributor can show you a good many ways to use ALLEN Dowel Pins, in addition to conventional uses in tool and die work. You can use them as economical roller bearings, axles, precision plugs, hinge and wrist pins—and in many other ways.

You can cut the cost of your product substantially, too—because your ALLEN Distributor can supply these strong, accurate, mirror-finished Dowel Pins in standard sizes right from stock.

Made of special Allenoy steel; surface hardened to 62-64 Rockwell C; precision ground to .0001" with micro-inch finish of 6 RMS max. Check your Allen Handbook or Catalog for detailed specs and standard sizes, or write direct for samples and technical information.



Genuine ALLEN products are available only through your ALLEN Distributor—he's always ready, willing and able to give you prompt, practical service.



## DESIGN DIGEST

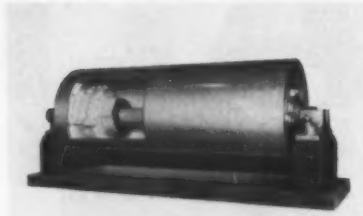
tected from heat damage by water-cooled flanges. Sizes run from 72 to 120 in. (William M. Bailey Co.)

For more data circle No. 34 on postcard, p. 181

### Conveyor Drive

A compact conveyor drive comes from 1 to 10 hp in 30 ratios from 2½ to 1 up to 215 to 1. The reducer is enclosed in a dirt-free

drum from which it is quickly removable. Drum diameters start at



12 in. The system is also available for winches and hoists, where the

gearing can be incorporated in the drum. (The Crichton Co.)

For more data circle No. 35 on postcard, p. 181

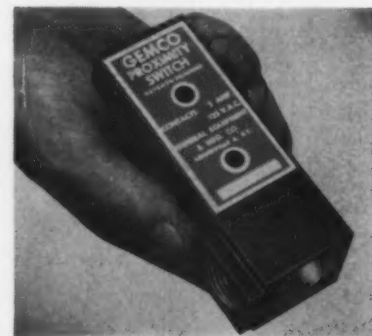
### Liquid Abrasive

An abrasive for wet blasting consists primarily of round glass beads. It imparts a silvery sheen to work cleaned and finished. With good cleaning properties and low metal removal, it has been used successfully in wet blasting all types of parts of all materials. (Techline Div., Wheelabrator Corp.)

For more data circle No. 36 on postcard, p. 181

### Proximity Limit Switch

Small and simple in construction, a magnetic proximity limit switch has only one moving part, and is not subject to mechanical failure or environmental limitations. It has an armature with silver contacts within a field of enclosed permanent magnets. Contacts are held closed until a foreign ferrous part comes into the sensing area, when



the contacts snap open, remaining open until the foreign part is removed from the sensing area. Unaffected by anything other than very strong external magnetic fields, it is suitable for use close to or upon resistance welders and will not false-trip. It fails safe in stray magnetic fields. (General Equipment and Mfg. Co.)

For more data circle No. 37 on postcard, p. 181

### Aluminum Enamel

A lustrous enamel-on-aluminum finish is roller-coated on strip for subsequent forming. Designed for mobile-home exterior panels, it comes in six colors. Non-chalking,



BIG TWIN  
250 AC DC



LITTLE TWIN  
180 AC DC

## AND BOTH MILLERS... Through and Through

BIG TWIN combination ac-dc welders work from single phase service — deliver new convenience and economy. Two a-c amperage ranges of 20-125 and 60-290 plus two d-c ranges of 18-100 and 65-290 amps master nearly every welding requirement from light gauge metal to structural pieces. Movable shunt type transformer affords infinite current adjustments. Other features include: Horizontal design for easy stacking; weather-resistant construction and Class B insulation; Miller-built semi-metallic rectifier for best d-c welding; high open circuit voltages and new weld stabilizer. This is THE all-time, all-around welder!

LITTLE TWIN ac-dc combination welder has two a-c amperage ranges of 20-115 and 60-180 plus one d-c range of 40-150. Operating from single phase service, this Miller model incorporates many design and construction features usually found only in large industrial types. These include really rugged construction, forced air cooling, new Miller semi-metallic rectifier, movable shunt type current control, new weld stabilizer and open circuit voltage in abundance. Power factor correction is available on both models. Complete specifications on either model will be sent promptly upon request.



ELECTRIC MANUFACTURING

Distributed in Canada by Canadian Liquid Air Co., Ltd., Montreal

COMPANY, INC. • APPLETON, WISCONSIN

it retains high gloss and durability, and should find many uses where exterior durability is essential. (Reynolds Metals Co.)

For more data circle No. 38 on postcard, p. 181

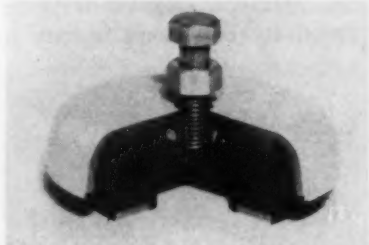
## Hydraulic Fluid

A special synthetic oil is excellent for hydraulic operations. A medium-viscosity fluid, it operates from  $-65^{\circ}$  to  $350^{\circ}\text{F}$ . It has an excellent viscosity-temperature relationship and a viscosity index of 206. Its evaporation rate of 5.1 means a non-drying lubricant that will last up to 100 times longer than ordinary petroleum products. Rust protection and anti-foam are built in. (Lehigh Chemical Co.)

For more data circle No. 39 on postcard, p. 181

## Machinery Mounts

Vibration eliminators are installed on machinery feet as the machine is moved into position. Holding the machine securely, they eliminate the need for drilling holes and lagging down. There is a



built-in leveling feature. Because such mounting is not permanent, great flexibility in plant operation results. Machines can quickly and easily be moved to the work flow. (Barry Controls Inc.)

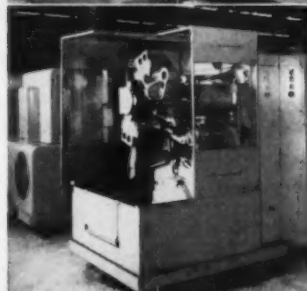
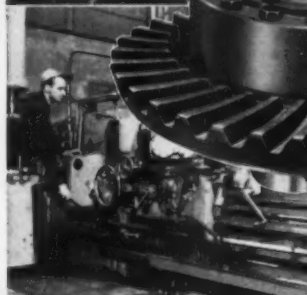
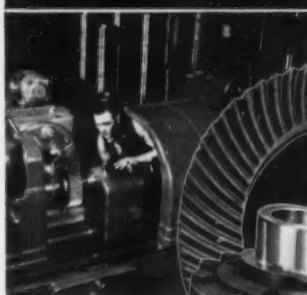
For more data circle No. 40 on postcard, p. 181

## Alumina Ramming Mix

A 90 - pct - alumina air - setting ramming mix boasts high temperature-resistance, very high strength at all temperatures when dried, and the ability to laminate to certain other refractories in the green, unfired state. It can thus be installed while subject to furnace heat and be laminated to less costly and better insulating material in the cooler inner portion of the wall. Extremely

# GEARS

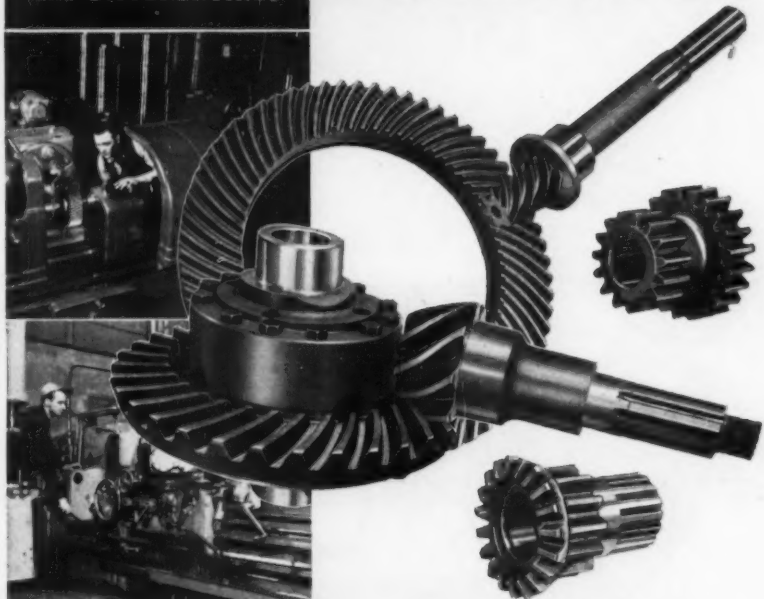
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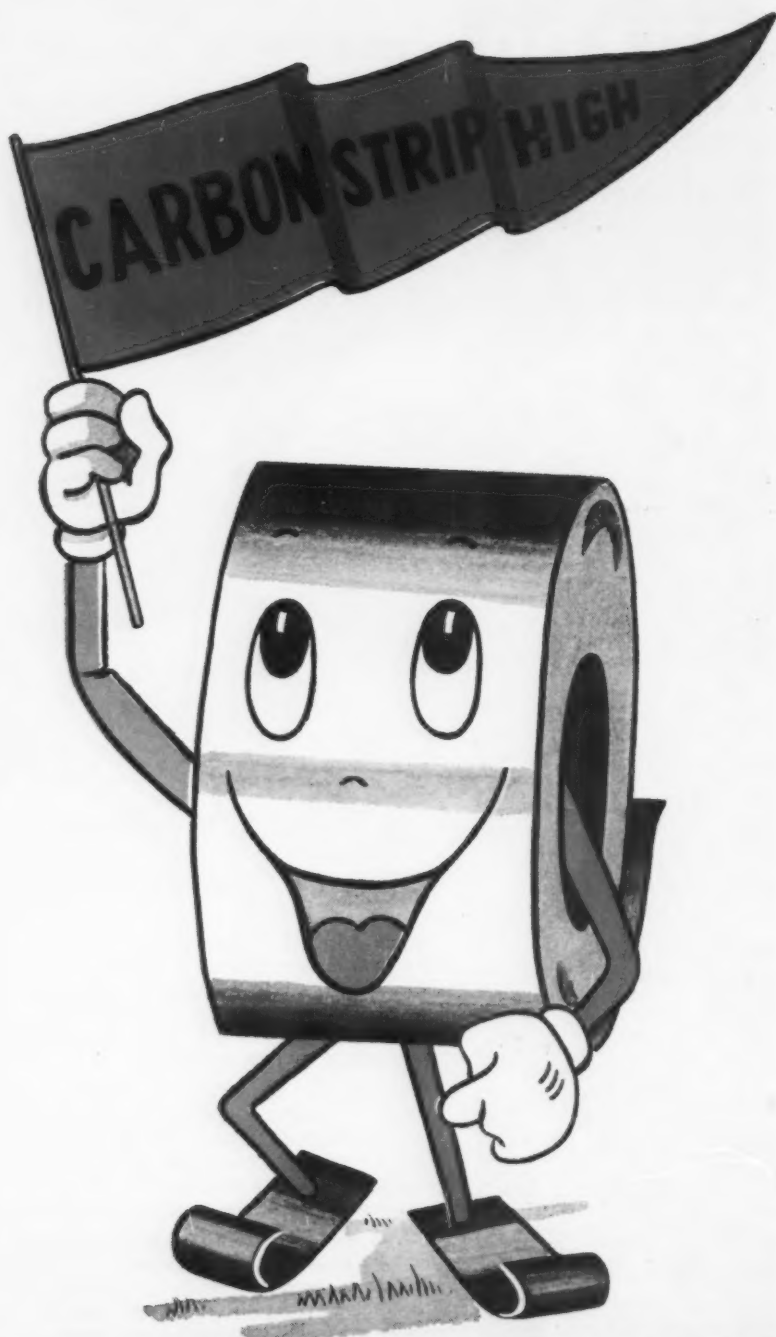
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MINING MACHINES • ROAD GRADERS • BUSES • STREET SWEEPERS • INDUSTRIAL LIFT TRUCKS



# PETERSON

## STEELS, INC.

THE 52100 HOUSE

UNION, NEW JERSEY • WETHERSFIELD, CONNECTICUT  
DETROIT, MICHIGAN • MELROSE PARK, ILLINOIS

### DESIGN DIGEST

resistant to abrasion and spalling, it can withstand the heaviest blooms and slabs without using skid rails. It has already been used very successfully in diverse applications. (The Ramtite Co.)

For more data circle No. 41 on postcard, p. 181

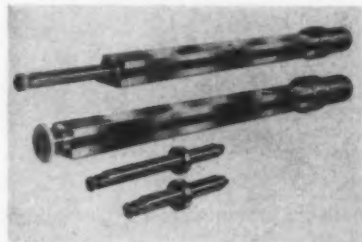
### Liquid Solder Flux

A general-purpose liquid flux is for use with all soft solders, to solder all metals except aluminum, magnesium, and diecastings. Non-acid, it eliminates precleaning, removes surface oxides, and expands the solder's capillary action in even the toughest applications. (All-State Welding Alloys Co., Inc.)

For more data circle No. 42 on postcard, p. 181

### Deep-Hole Spindle

The spindle pictured is 14 ft long. It is a precision heavy-duty boring-mill ram equipped with a two-speed motor and interchangeable extension spindles. It is designed for exceptional rigidity to

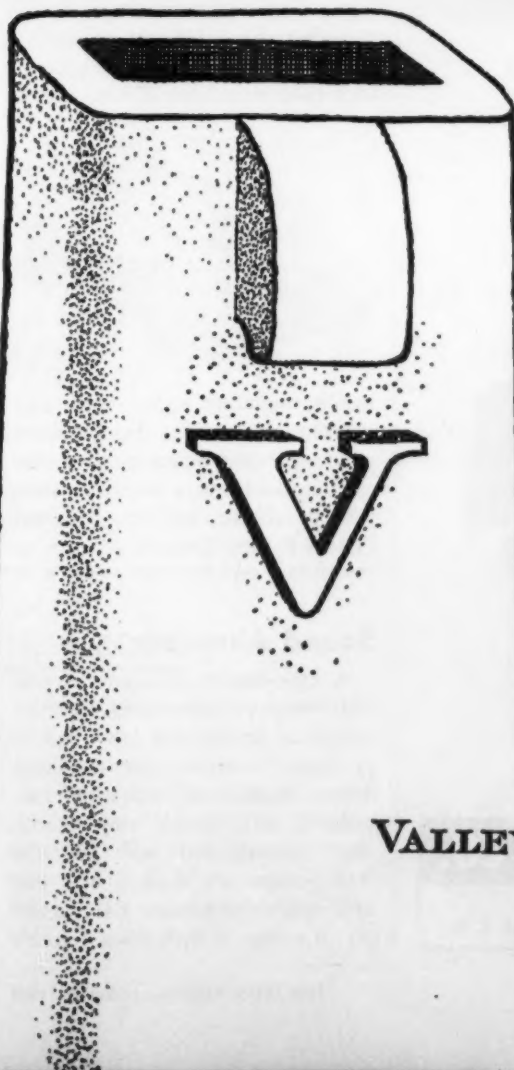


permit heavy cuts, good finish-ground holes, and long wheel life. All rotating parts are dynamically balanced, and bearings are permanently lubricated. (Pope Machinery Corp.)

For more data circle No. 43 on postcard, p. 181

### Thin-Shell Bearings

An expanded line of thin-shell needle bearings includes 14 sizes from  $\frac{3}{8}$ - to  $1\frac{3}{8}$ -in. bore. Spherical-end needle rollers give up to 90 pct more capacity and 7 times more bearing life than comparable bearings with conical-end rollers. This allows the use of bearings which are at once smaller and of lower cost.



**T**omorrow

we'll harness the energy of the sun . . . .

but even then

steel will be poured into

**VALLEY  
INGOT  
MOULDS**

**VALLEY MOULD AND IRON CORPORATION**

GENERAL OFFICES: Hubbard, Ohio  
WESTERN OFFICE: Chicago, Illinois  
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## STOCK HOUSE OR HIGH LINE

### *operators prefer the* **DEPENDABILITY of ATLAS CARS**

These specially designed units are another example of the ruggedness of Atlas Cars. Their dependability helps maintain the most rigid furnace charging cycles.



**40-TON SCALE CAR**  
**Double Hopper Bottom Dump**



**75-TON ORE TRANSFER**  
**Gable Bottom Double Side Dump**



**THE ATLAS CAR & MFG. CO.**

ENGINEERS  
1140 IVANHOE RD.

MANUFACTURERS  
CLEVELAND 10, OHIO, U. S. A.

## DESIGN DIGEST

All sizes exceed requirements for operation up to 6000 rpm. (The Kaydon Engineering Corp.)

For more data circle No. 44 on postcard, p. 181

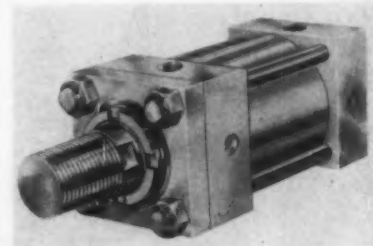
### Grinding Coolant

A premium-quality oil is designed for medium-duty cutting and grinding. It has a sulphur chlorinated base with fatty E.P. characteristics, and thus provides fine finishes. It does not have to be changed between different operations. It prevents wheel load-up and cools as it lubricates under extreme pressures. (Shear-Speed Chemical Products)

For more data circle No. 45 on postcard, p. 181

### Hydraulic Cylinders

Ease of installation and smooth, precise power highlight a line of heavy-duty high-pressure hydraulic cylinders for 2000-psi operation (3000 psi non-shock). They come with bore sizes from 1½ to 12 in.,



in 23 mounting styles, with four different rod ends. For maintenance, the piston assembly is easy to remove, being a cartridge unit, without dismantling the cylinder. (The S-P Mfg. Corp.)

For more data circle No. 46 on postcard, p. 181

### Sound Absorber

A high-density, low-mass, sound and vibration attenuating material minimizes undesirable low-frequency sound energies and markedly lowers mechanical vibration motions. It is a flexible vinyl plastic sheet impregnated with metallic lead powder and backed with one of a number of fabrics. Easy to apply, it comes in rolls from 1 to 38

in. wide. Even a few narrow strips stop the vibration energy patterns of a large area of sheet metal. Free samples are obtainable. (Cordo Chemical Corp.)

For more data circle No. 47 on postcard, p. 181

### Epoxy Stripper

Stripper S-28, second in a series of strippers for epoxy enamels, works at room temperature, at up to 1-to-20 dilutions in water. Wrinkling rather than dissolving epoxy coatings, it does not become contaminated and has long life. (Enthone, Inc.)

For more data circle No. 48 on postcard, p. 181

### High-Temp Lubricant

A concentrated dispersion of colloidal molybdenum disulphide in a lubricant, a new lubricant resists settling and lubricates at temperatures above the point where most petroleum oils carbonate. Typical uses are on oven conveyors, kiln cars, gears, and bearings. (Acheson Colloids Co.)

For more data circle No. 49 on postcard, p. 181

### Sealer Nuts

Sealing against dirt, liquids, and other foreign matter, and cutting damage and noise from vibration, sealer nuts consist of a free-turning hex nut and a cupped heat-treated spring-steel washer over a sponge plastisol sealer  $\frac{1}{8}$  in. thick. The sealer can be molded to various product shapes to suit needs. These nuts have already been used in quantity by the auto industry. Nut size is 10-24 NC-2. Washer OD is  $\frac{5}{8}$  in. (The Stanley Works)

For more data circle No. 50 on postcard, p. 181

### NEW BOOK

"Japan's Iron & Steel Industry," 1959 edition, summarizes 1958 developments, gives details of the leading companies, offers statistics, and provides a record of ordinary rolled sizes and a useful directory of companies. 283 pp. \$3 per copy. Tokyo Foreign Service, Central PO Box 1157, Tokyo, Japan.



## Townsend Lockbolts now available in Stainless Steel for greater strength ...corrosion resistance

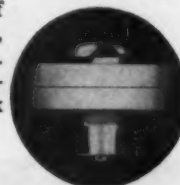
If you need extra strength in fastening your assembly—plus corrosion resistance—you can get both now with Townsend 18-8 stainless steel lockbolts.

The use of Townsend stainless lockbolts gives you greater flexibility of design and the values are highly uniform. There is no chance for human error in setting lockbolts. Men with no special training get strong, vibration-proof joints every time.

Townsend stainless lockbolts are vastly easier to install—for example, they eliminate the back breaking work of bucking stainless rivets which work-harden rapidly.

Townsend lockbolts are also available in carbon steel and aluminum alloy in a wide range of diameters and grip lengths in brazier, button and 90° countersunk head styles. Write today for information to Engineered Fasteners Division, P.O. Box 71-B, Ellwood City, Pennsylvania.

Licensed under Huck patents RE 22,792; 2,114,493; 2,527,307; 2,531,048; 2,531,049 and 2,754,703

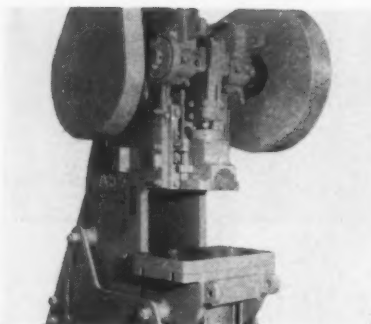


### Townsend Company

#### Engineered Fasteners Division

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# New Equipment and Machinery

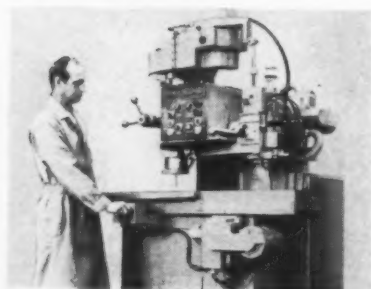


## OBI Presses Adaptable to Continuous Operation

A new series of open-back inclinable presses are ideal for continuous work requiring clutch engagement and disengagement at every stroke. Flat surfaces on front and sides simplify fitting feed roll lifters and other attachments. The solid slide casting is brought forward to provide solid backing for

the dies. Rigid, multiple-V gibs insure accurate alignment, balanced loading, and greater guiding surface. Simple electric circuitry and controls make operation easier and safer. There are 13 sizes, shafts 1¼ to 6½ in., capacities 5½ to 190 tons. (Niagara Machine & Tool Works)

For more data circle No. 61 on postcard, p. 181

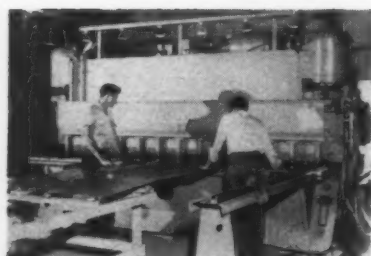


## Does 360° Milling With Automatic Tracer Control

Operating off an easily prepared sheet-steel template, a new machine does 360° profile milling under tracer control. It reproduces complex, irregular 2-dimensional shapes with high speeds, feeds, accuracy, and metal-removal rates. Precision results from the machine's rigidity

and lack of backlash, and a very sensitive tracer system. A 5-hp drive provides 7 speeds from 375 to 5200 rpm, and constant feeds run up to 80 ipm. Automatic operation permits high production rates. (Pratt & Whitney Co., Inc.)

For more data circle No. 62 on postcard, p. 181



## Hydraulic Plate Shear Features "Cut Control"

"Cut control" on a new shear permits it to serve as 3 shears by permitting adjustment of rake, knife clearance, holddown hammering and tonnage, and back-gage setting and positioning. It cuts 20-gage to ¾-in. plate; eliminates twist, bow,

or camber; cuts soft metals without marking; and operates up to 70 spm. Fast, efficient positioning of work is possible, and remote-foot-pedal control is provided. (Pacific Industrial Mfg. Co.)

For more data circle No. 63 on postcard, p. 181



## Heavy-Duty Open-Gap Press Forms Large Stock

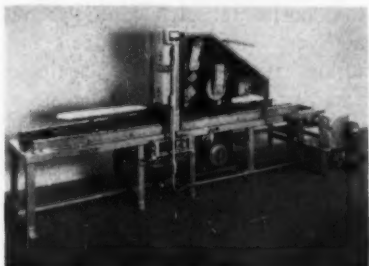
Pictured forming 7¼-in.-square stock into a half-rim, an 800-ton hydraulic gap-frame press also forms plate up to 5 in. thick. Pendant control permits operator and loader to run it with ease. The double-acting ram has a rapid advance and return speed of 235 ipm,

pressing speed of 17 ipm. Total stroke is 36 in. Other features include a forged steel cylinder, 60-in. throat depth, a 48 x 48-in. ram plate, and a 72 x 84-in. bolster plate. The frame is of three-piece welded construction. (E. W. Bliss Co.)

For more data circle No. 64 on postcard, p. 181

## Convex-Concave Grinder

An abrasive-belt head permits grinding and polishing of convex or concave surfaces of all types of castings. Positive belt control at heavy work pressure prevents run-



off, and enables heavier cuts and fewer passes. Rigid construction and the formed contact wheel afford closer tolerances and truer shape on the product. (Murray-Way Corp.)

For more data circle No. 65 on postcard, p. 181

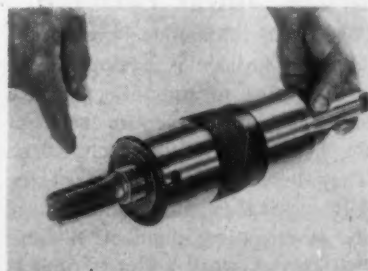
## Flap Buffing Wheel

A flap-type buffing and polishing wheel is non-streaking and self-cooling, and always leaves a clean, smooth-buffed surface. The flap design keeps fraying to a minimum and applies compound more evenly. It is made of cloth, sisal, or a combination of both in varied densities for different cutting and coloring jobs, and for working different shapes. (American Buff Co.)

For more data circle No. 66 on postcard, p. 181

## Lead-Screw Tapper

A lead-screw tapping head permits precision tapping on larger threads than hitherto possible. It



has the lead screw as an integral part of the tap in larger sizes. In smaller sizes, a separate lead screw is furnished for each pitch of thread to be tapped. Self-releasing, it can

be used on multiple-spindle drill presses to tap many holes simultaneously. It is 3 in. in diam, 11 in. long, with special shanks on order. It can tap up to 2½-in. diam, 2½ in. deep. (Horspool & Romine Mfg. Co.)

For more data circle No. 67 on postcard, p. 181

## Hydraulic Presses

A line of straight-side, single-action hydraulic presses has been expanded to cover a 25- through

1000-ton range. They can be used to trim, bend, form, blank, briquet, broach, coin, emboss, forge, and straighten. Featuring welded-steel construction to minimize deflection, they have angle gibs at platen corners to insure platen-to-bed parallelism for utmost accuracy and longest possible die life. All 48 models come with either up- or down-acting platens, constant or variable-speed pumping systems, and manual-lever or electric-push-

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**NEW EQUIPMENT**

button controls for single or continuous cycling. (K. R. Wilson, Inc.)

For more data circle No. 68 on postcard, p. 181

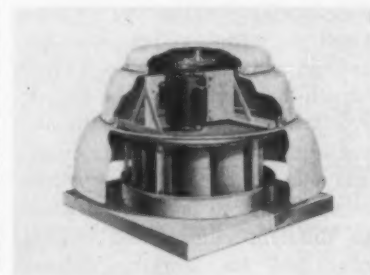
**Horizontal Band Saw**

A horizontal metalcutting band saw was specially developed for cutting risers from large castings. It has a 60 x 60-in. capacity and a maximum length of cut of 18 in. Hydraulic cylinders raise the cutting head on the frame so as to maintain perfect alignment. Cutting speed is infinitely adjustable from 60 to 300 fpm. (W. F. Wells & Sons)

For more data circle No. 69 on postcard, p. 181

**Roof Ventilators**

Centrifugal fan roof ventilators feature low contours and 25 basic selections of tip speeds and capacities in direct-drive models, and



64 basic belt-drive models, with ratings from 1/60 to 7½ hp. Their capacities range from 28 to 65 cfm. (The Burt Mfg. Co.)

For more data circle No. 70 on postcard, p. 181

**Braze, Sinter Furnace**

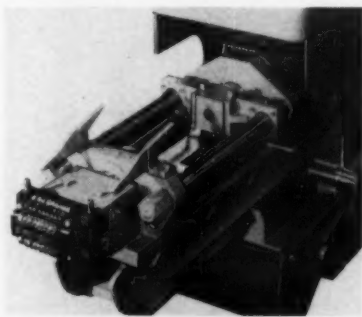
A 14-ft continuous brazing and sintering furnace is equipped with gas curtains to provide protective atmosphere for the entire length of the heating and cooling chambers. They function at entrance of the 4-ft heating chamber and exit of the 10-ft cooling chamber. A mesh belt carries work under a preheat hood through a ceramic tile door into the heating chamber, 12 x 8 x 48 in. in size, where it is heated to a maximum temperature of 2300°F. Work goes through a similar ce-

ramic tile door into the cooling chamber, which is enclosed on all sides by at least 2 in. of water. (Waltz Furnace Co.)

For more data circle No. 71 on postcard, p. 181

## Heavy-Duty Marker

An automatic stamper is designed for steel-mill marking of slabs, blooms, or billets. The operator sets the desired mark from a remote-control console, indexing character wheels to set up the particular mark. After the head is set up, the indexing mechanism is disengaged, and the impact thrust to produce the mark begins. When the mark has been made, the head returns to be



reengaged for the next indexing. The indexing mechanism remains removed from the dangers of heat and impact shock. The stamping head, in action, aligns itself to the end of the cut, where it is held in position until the powerful impact action indents the marking. The advanced design of the digital computer control makes it adaptable to tape or punched-card control. (Jas. H. Matthews & Co.)

For more data circle No. 72 on postcard, p. 181

## Low Cost Tracer System

An economical two-dimensional tracer system is electro-mechanically controlled and will follow any contour around a 360° path at a constant speed—regardless of direction. Cutting speed can be varied manually, or automatically controlled as a function of spindle speed to maintain a constant feed rate in inches per spindle revolution. Available as a package and easily adaptable to existing machine tools, it will work under

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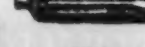
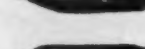
ARMSTRONG Set-up and Hold-down Tools reduce setting-up time—keep men and machines producing. Designed for use on planers, drill presses, milling machines, etc., they hold work securely and rigidly, and thereby reduce spoilage and prevent costly accidents. Your local Armstrong Distributor carries ARMSTRONG Set-up and Hold-down Tools in stock in sizes for every operation. Stop hazardous setting-up methods. Provide each of your machines with a full complement of ARMSTRONG Set-up and Hold-down Tools.

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## NEW EQUIPMENT

either computer or punched-tape control. (Seneca Falls Machine Co.)  
For more data circle No. 73 on postcard, p.181

### Dial Groove Gage

A dial-indicating groove gage has a 0.0005-in. reading indicator with 2¼ in. of diameter range adjustment. It is useful for short-run parts inspection where precision, but economical, gaging is required. It mea-

sures grooves from ¼- to 3-in. diam, to a maximum groove depth of ⅛ in., with 3/32-in. minimum width. Maximum throat dept is 1½ in. (Boice Gages Inc.)

For more data circle No. 74 on postcard, p. 181

### Grinding-Wheel Dresser

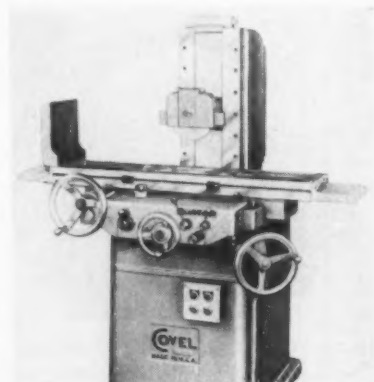
A new grinding-wheel dresser uses six small, elongated diamonds mounted at the points of a hexagonal steel matrix. They present the same contact area through their life, lowering grinding heat and increas-

ing grinding efficiency. When one diamond wears out, the matrix is indexed to bring the next diamond into play, and set with a clamping screw. Thus the dresser stays sharp over its entire life. It never requires redressing, and is a "throwaway"-type tool. (Precision Diamond Tool Co.)

For more data circle No. 75 on postcard, p. 181

### Precision Grinder

A hydraulic precision surface grinder offers a number of advantages. It has 16½-in. vertical capacity from 7-in. wheel to table top. It has infinitely variable cross-feed and rapid traverse for wheel-



dressing or quick work-positioning. Power elevation and inverted-V cross-ways are also featured. A number of attachments are available, including those for wet grinding and automatic downfeed at end of stroke. (Covel Mfg. Co.)

For more data circle No. 76 on postcard, p. 181

### Aircraft Drills

Designed for hard materials, drills made of 8-pct-cobalt HSS have split points for fast penetration and short flute length for rigidity. A new flute design affords maximum chip clearing and cutting efficiency. They come in 7/64-through ¾-in. sizes. (Whitman & Barnes)

For more data circle No. 77 on postcard, p. 181

### Traverse Cutter

A traverse-type metalcutting machine features power raising and lowering of rails to quickly obtain

## New Power Packed "750 CS" Bales Car Bodies in Just 3 Minutes



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"RAM-PAN LOADER"  
SPEEDS PRE-BALING  
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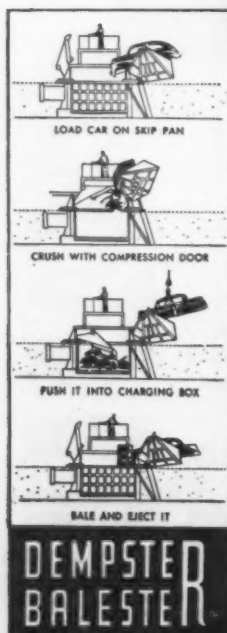
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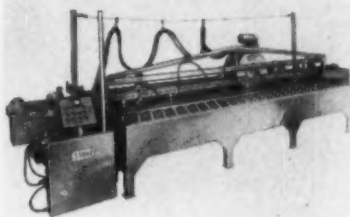
### ROLLS

Nickel Alloy Grain Rolls	Nickel Chilled Rolls
Grain Rolls	Moly Rolls
Chilled Rolls	Nodular Iron Rolls

All Grades Nickel Alloy Iron  
Rolls for Hot and Cold Rolling



correct wheel arc of contact for any thickness of sheet and plate stock, by pushbutton control. Rails are instantly adjustable from 2¼ to 7¼ in. above the table top; precise adjustments are then made by independently raising or lowering the cutting head. This arrangement provides maximum wheel efficiency, in-

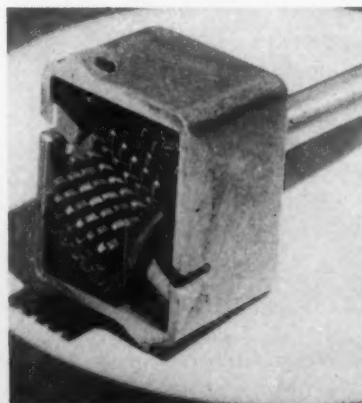


creases wheel life, and speeds positioning for step-and-repeat cuts. Positive-action air clamps hold the stock in position. The standard 12-in. blade is powered by a 10-hp motor. The machine cuts ferrous and nonferrous sheet and plate stock at high rates of speed and to exceptionally close tolerances. (Stone Machinery Co.)

For more data circle No. 78 on postcard, p. 181

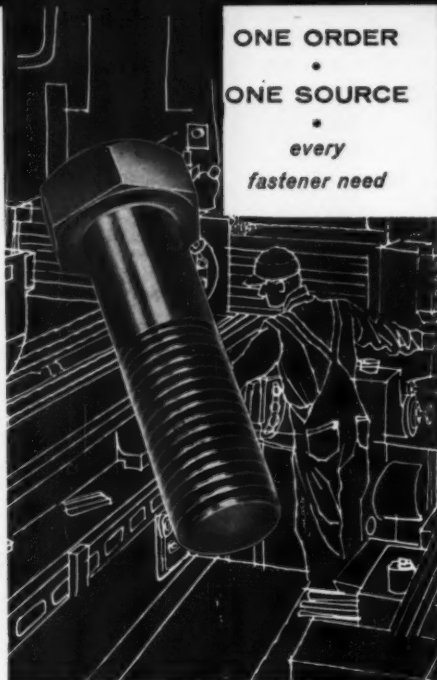
## Grinding-Wheel Dresser

A heavy-duty, low-cost, grinding-wheel dresser uses arbor equipment and sealed ball bearings. Especially developed cutters and abrasive



wheels are interchangeable. The built-in tangential angle of the cutters (or wheels) eliminates the need for a breaking device and assures sharp, cool grinding without burn checks or flying dead grain. It has

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every  
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# WHEELABRATOR

STEEL ABRASIVES

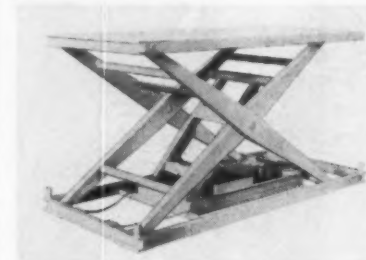
## NEW EQUIPMENT

a  $\frac{3}{4}$ -in. shank and is 6 in. long.  
(L. Newman)

For more data circle No. 79 on postcard, p. 181

### Lift Tables

Scissor-type, hydraulic-powered lift tables simplify lifting, feeding, and work-positioning of long loads for machine, process, or assembly



operations. Capacities range from 1000 to 6000 lb, and platforms come in different sizes. (Southworth Machine Co.)

For more data circle No. 80 on postcard, p. 181

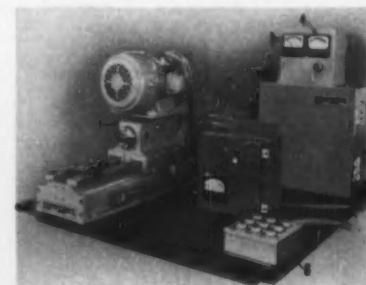
### Releasing Tapholder

A releasing tapholder gives positive, full-floating drive while compensating for variations of tap lead from machine feed. This insures perfect follow-up and prevents tap breakage. Amount of float is adjustable. (Burgmaster Corp.)

For more data circle No. 81 on postcard, p. 181

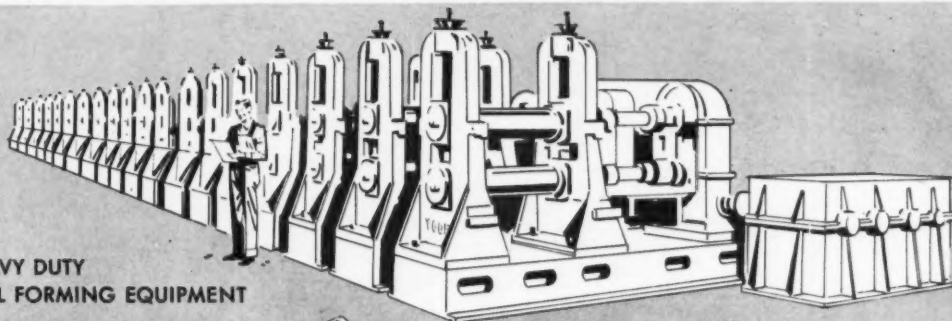
### Gun-Drill Kit

A deep-hole drilling machine comes in "do-it-yourself" kit form. Illustrated are the six components: (1) power unit, (2) spindle load

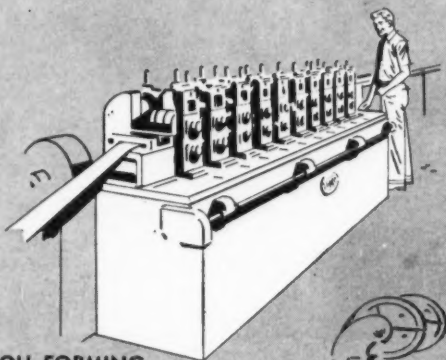


meter, (3) feed rate meter, (4) tachometer, (5) control cabinet, and (6) control panel. Infinitely variable speeds and feeds can be dialed for deep-hole gun-drilling or gun-bor-

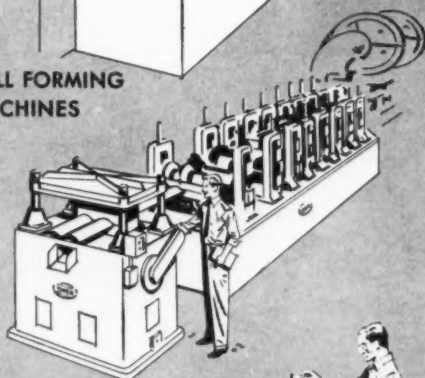
**HEAVY DUTY  
ROLL FORMING EQUIPMENT**



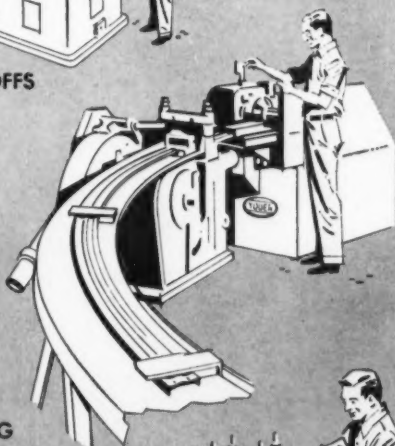
**ROLL FORMING  
MACHINES**



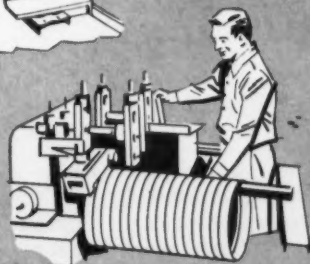
**CUT-OFFS**



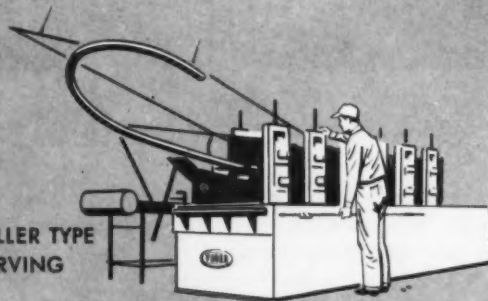
**CURVING  
ATTACHMENTS**



**COILING  
EQUIPMENT**



**ROLLER TYPE  
CURVING**



## **YODER COLD ROLL-FORMING EQUIPMENT**

*for profitable mass production*

High speed, YODER Cold Roll-Forming machines are the most economical method for mass producing structural or ornamental shapes. One machine with one operator can form up to 40,000 feet of shapes per day. Even on a part-time basis, a YODER Cold Roll-Forming machine can prove to be a profitable investment.

YODER flexibility works for you too, curving, coiling, ring forming, multiple roll-forming and embossing—on a wide variety of metals—can be incorporated into your production line. Practical, YODER-engineered design minimizes maintenance and downtime... assures uniformity, accuracy and reliability of your end product.

In addition to Roll-Forming machinery, YODER also makes a full line of Rotary Slitting equipment, Pipe and Tube mills. Send for the fully descriptive Cold Roll-Forming Book.

### **THE YODER COMPANY**

5510 Walworth Ave. • Cleveland 2, Ohio

ENGINEERING

**YODER**

MANUFACTURING

**COLD ROLL FORMING MACHINES**

**PIPE AND TUBE MILLS (ferrous or non-ferrous)**

**ROTARY SLITTING LINES**



Photograph by Bruce Davidson

## HARRY SUMNER AND THE 20,000-MILE RELAY TEAM

Place an order today for Alcoa® Aluminum and it will complete the circuit from local sales office to production planning headquarters in Pittsburgh and then to the plant that will make it—all before the day is out.

Behind this remarkable efficiency is a 20,000-mile teletype network that links Harry Sumner and his fellow sales administrators in 72 sales offices with

every Alcoa production facility from Edgewater, N. J., to Vernon, Calif. Not only can they transmit new orders with the speed of light, but by shortly after noon each day, they can tell you what has been shipped the previous day against existing orders.

Alcoa sales administrators are college graduates with an expert knowledge of customer needs and how to satisfy those

needs. By combining their knowledge and experience with automated communications, Alcoa affords you opportunity for greater-than-ever efficiency in your own operations, with deliveries tightly geared to production needs. It's another extra value in every pound of Alcoa Aluminum you buy. Aluminum Company of America, 2018-L Alcoa Building, Pittsburgh 19, Pa.



**ALCOA** helps you design it, make it, sell it



### Alcoa has hundreds of Harry Sumners to help you design it, make it, sell it

All of Alcoa's skills are mobilized to a single purpose: To put more than just 16 ounces of metal in every pound of Alcoa Aluminum you buy. Here are 12 of the dozens of ways to do it:

1. **Research Leadership**, bringing you the very latest in aluminum alloys and applications.
2. **Product Development** by specialists in your industry and your markets.
3. **Process Development Labs** for aid in finishing, joining and fabricating.
4. **Service Inspectors** to help solve production problems at your plant.
5. **Quality Control** to meet top standards or match your special needs.
6. **Complete Line** including all commercial forms, alloys, gages, tempers.
7. **Availability** via the nation's best stocked aluminum distributors.
8. **Foremost Library** of films and books to help you do more with aluminum.
9. **Trained Salesmen** with a wealth of on-the-spot information.
10. **Sales Administrators** constantly on call to service your orders.
11. **Year-Round Promotions** expanding your old markets, building new ones.
12. **The Alcoa Label**, leading symbol of quality aluminum, to mark your goods.

#### Added Values With Alcoa Aluminum



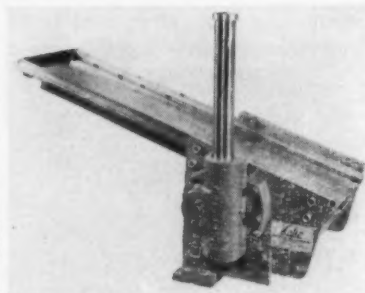
... is a case book of Alcoa special services and a guide to their availability in design, manufacture and sales. Your copy, with some of the most rewarding information you may ever read, is waiting and it's FREE. Write: Aluminum Company of America, 2018-L Alcoa Building, Pittsburgh 19, Pa.

ing of finished holes in one pass from the solid. In addition to economy, the kit form permits arranging the components to fit any job. (Drillmation Co., Inc.)

For more data circle No. 82 on postcard, p. 181

### Press Unloader

Controlled by movement of the press ram, a tray-type reciprocating unloader with variable stroke removes parts and blanks from me-



chanical presses. During up-stroke, the tray slides underneath the die and receives the part or blank. During down-stroke, it emerges with the part, which drops in a bin



## NEW EQUIPMENT

or on a conveyor. A rack-driven and a cable-driven model are available. Change gears vary the tray stroke from 10 to 20 in. on small models with up to 36-in. trays, and from 12 to 30 in. on large models having up to 72-in. trays. (Lahr Machine & Tool Co.)

For more data circle No. 83 on postcard, p. 181

### Blade-Type Micrometers

Micrometers with blade-type anvils and spindles facilitate measur-



ing depths of narrow grooves, slots, keyways, or recesses. They are also useful for measuring diameters be-

*custom  
designing  
is an old  
CAROLINAS  
tradition*

### NOW IT APPLIES TO "PACKAGED PLANT FINANCING" TOO!

Hundreds of fine CP&L communities offer LOCAL CAPITAL for sound investment in industrial buildings. Business-minded citizens will help *custom-plan* a plant to your specifications and financing to suit your needs. For information contact D. E. Stewart, Mgr., Area Development Dept., TE 2-4611, Raleigh, North Carolina.

**CAROLINA POWER & LIGHT COMPANY**

# STEEL *from Wheelock, Lovejoy* BULLETIN

**W-L DETROIT** For the first time, HY-TEN D-2 air hardening steel now available here in rounds, squares, flats and billets. Also a fine stock of standard alloy grades, especially A-8620, as well as all HY-TEN grades. Excellent service from our new warehouse.

**W-L CHICAGO** Steady demand for "B" No. 3X for flame-hardened parts such as boring bars. Good stocks of HY-TEN AIS—the best carburizing alloy steel, and freest machining available today—a new W-L exclusive!

**W-L CINCINNATI** This 23-station Avey Line-O-Dex transfer machine, designed and built by The Avey Division of Motch & Merryweather Machinery Co., Cincinnati, Ohio, is equipped with spindles made of our HY-TEN "B" No. 2. This grade was chosen for its great tensile strength (100,000 P. S. I. in the natural condition), toughness, and fine wearing qualities.



**W-L CAMBRIDGE** We are now distributing FLEXANGLE, the easy-to-erect structure assembly for all types of racks, shelves, platforms, etc. It's completely universal and low in cost—can be used anywhere, by anyone, for any storage purpose.

**W-L HILLSIDE** Our stock of flat and square sizes in HY-TEN M Temper Oil Hardening Steel can save you time and money in your tooling program. HY-TEN "B" No. 3X pre-heat treated in rounds, squares and flats available in a wide range of sizes. Billets on hand for hammer forging in all grades of HY-TEN.

**W-L CLEVELAND** Excellent stock of brake die flats and squares. Also many sizes up to 16" x 18" in HY-TEN Mold Steel. Excellent deliveries.

**W-L BUFFALO** A wide range of rounds and hexagons in cold drawn AISI leaded and non-leaded A-4140. Also many sizes of the new "B" No. 3X-40 in rounds and hexagons.

Write our Cambridge office today for your free Wheelock, Lovejoy Data Sheets. They'll give you complete technical information on grades, applications, physical properties, tests, heat treating, etc.



**WHEELOCK,  
LOVEJOY**

& COMPANY, INC.

126 Sidney Street, Cambridge 39, Mass.

AGENTS: Southern Engineering Company, Charlotte, N. C.;  
Sanderson-Newbould, Ltd., Montreal & Toronto



## NEW EQUIPMENT

tween lands, fins, or ridges, as on circular forming tools. They come in five sizes. (The L. S. Starrett Co.)  
For more data circle No. 84 on postcard, p. 181

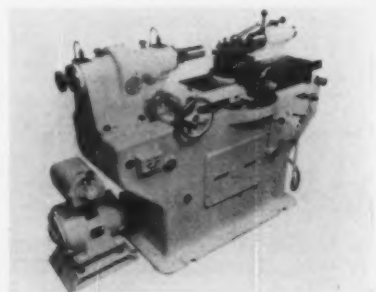
### Lightweight Chuck

A new 15-in. power chuck has an aluminum body and weighs only 145 lb. Keyways are gibbed and precision is guaranteed within 0.001 in. The light weight results in faster starts and higher gripping power at high speeds (new-design jaws exert less centrifugal force). Also, less power is required, and there is less machine brake wear and maintenance. (Buck Tool Co.)

For more data circle No. 85 on postcard, p. 181

### Super-Finish Lathe

Now available is an English-made precision diamond-tool lathe specially designed to turn surfaces of exceptional super finish and accuracy (3 to 5 micro in.). It is particularly useful for nonferrous machine components for assembly



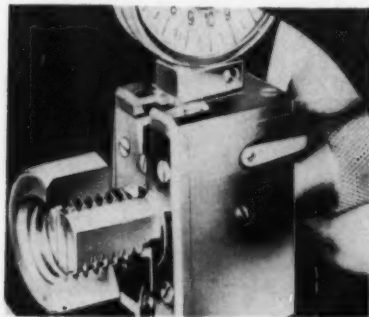
with mating parts, eliminating lapping and honing operations. It uses diamond, ceramic, or carbide tools. With 8-in. capacity, it has a center distance of 17½ in., three automatic feeds from 0.001 to 0.005 ipr, and six spindle speeds from 705 to 2920 rpm. (Milo Mfg. Co.)

For more data circle No. 86 on postcard, p. 181

### Dial Thread Gage

An expanding dial thread gage for internal threads is faster and more economical to use than conventional screw-in plug gages. Readings are in 0.0005-in. increments. Interchangeable sets of mea-

suring jaws are supplied for different size ranges. Use of limit clips on the dial permits "go-no go" gaging in one fast operation. With



smooth-faced blades, it can be used as a plug gage for smooth bores. (Mahr Gage Co., Inc.)

For more data circle No. 87 on postcard, p. 181

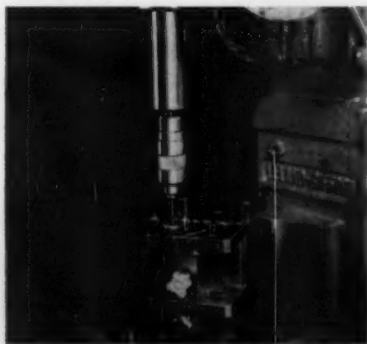
### Hi-Speed Air Cylinder

Designed for use to 3600 rpm, a new rotating air cylinder meets the need for greater spindle speeds on modern metalworking machines. Its housings and covers are of lightweight aluminum alloy, reducing flywheel effect, and hence reducing the load on the machine's motor, clutch, and brake. Available in 3- to 16-in. bore sizes, it has an extra long stroke, giving a power bonus when serving as actuator for all types of rotary holding devices. (The S-P Mfg. Corp.)

For more data circle No. 88 on postcard, p. 181

### Stops Drill Breakage

A torque-sensitive driver for drilling and reaming prevents drill breakage caused by dulling of tools and improper operation of manual-



feed machines. An adjustable over-rolling-type clutch disengages the tool when breakage is imminent. Sensing any slight increase in

torque, the device saves small drills, which walk or bend easily in hard materials, and which suffer from overfeeding by the operator. (Scully-Jones and Co.)

For more data circle No. 89 on postcard, p. 181

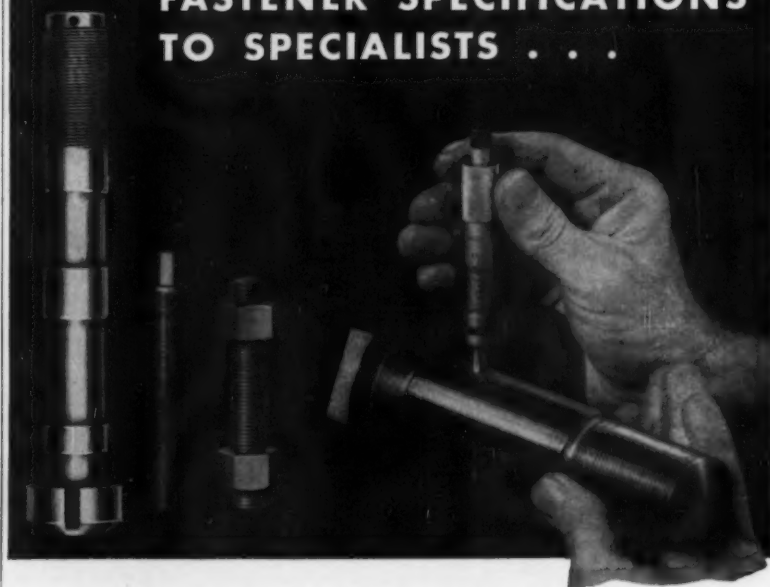
### V-Mill

A two-column V-mill features extreme rigidity, high precision and high capacity. Hand-scraped V-ways on both table and cross-slide insure perfect straight-line motion.

Hand-fitted adjustable tapered gibs are used. Table dimensions are 14 x 36 in. with 20-in. travel. Range is 16 in. cross travel, 17 in. vertical travel, and 4 in. spindle travel. Horizontal space between columns is 17½ in. It is available as standard with 1-hp Bridgeport 8-speed milling, drilling, and boring head, or other milling heads as optional equipment. (Williams and Hussey Machine Corp.)

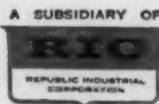
For more data circle No. 90 on postcard, p. 181

## IT PAYS TO SEND YOUR FASTENER SPECIFICATIONS TO SPECIALISTS . . .



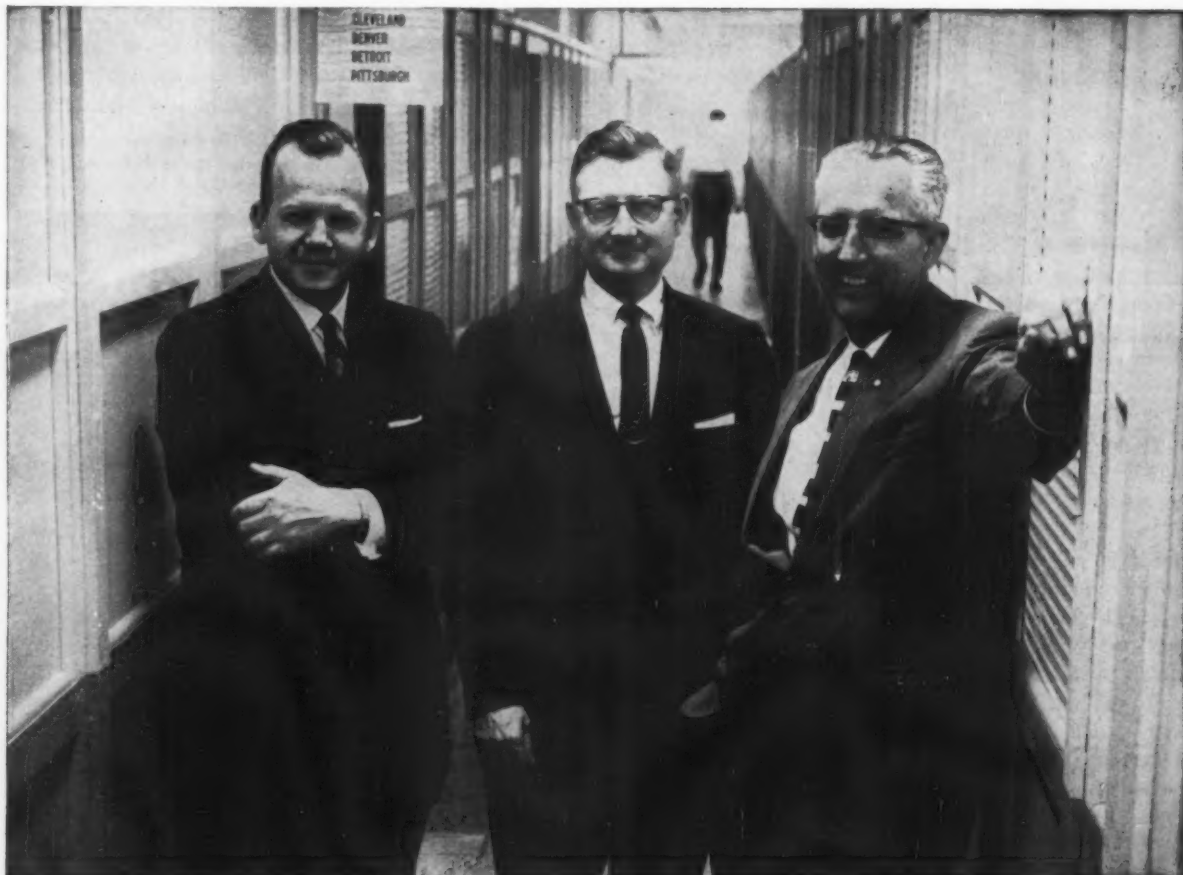
### ERIE BOLTS • STUDS • CAP SCREWS • NUTS In Alloys • Stainless • Carbon • Bronze

Your fastener specifications take shape with watchmaker's precision at ERIE. Our craftsmanship is backed by almost a half century of specialized experience. Since 1913, our sole business has been the production of fasteners to customer, government or national standards . . . fasteners to meet extreme temperatures, corrosion, tensiles, fatigue, impact, shear stresses . . . fasteners for railroads, refineries, diesels, farm and earth moving equipment and other heavy machinery. This wealth of experience will return full value to you when you submit your fastener specifications to us.



**ERIE BOLT & NUT CO.**  
Erie, Pennsylvania  
Representatives in Principal Cities

*Now the nation's  
third largest  
steel plate producer*



Left to right: George Copeland, Manager of Lukens' newly consolidated Sales Service Division, with department heads Arthur Powers of Customer Service, and Richard Slider of Order Processing.

## LUKENS STREAMLINES ITS CUSTOMER SERVICES

The demanding process of making quality steel plate can't be rushed. But Lukens *has* cut the time it takes to process your orders and answer service inquiries.

In our *Customer Service Dept.*, for example, quotations, order status information, and similar requests are now handled by five area supervisors, each with a specific geographic territory to serve. All five are located in Coatesville. They and their staff members are ready to supply detailed information on any and all Lukens products — *promptly* through our sales offices.

Result: shortened lines of communication . . . faster action . . . greater customer satisfaction.

Equally important, our *Order Processing Dept.* has also been re-shaped. This one department now handles all orders for Lukens' full range of plate and fabricated products.

Streamlining our entire service organization was a logical complement to Lukens' "Phase A" expansion objectives: *new capacity and quality levels to meet the growing needs of our plate fabricating customers.*

Lukens Steel Company, Coatesville, Pa.

**NEW CAPACITY ~ NEW QUALITY**



SERVING INDUSTRY WITH A WIDE RANGE OF SPECIALTY CARBON, ALLOY, ARMOR AND CLAD STEEL PLATE • HEADS • PLATE SHAPES • PLATE-MATE WELDING ELECTRODES AND WIRE

## The Iron Age Summary

## Injunction Brings Scant Relief

**Steel consumers will get little more than emergency relief from the T-H injunction.**

**Recovery will be slow, and mills will consider danger of a new strike after the injunction.**

■ The Taft-Hartley injunction will mean only a small reprieve for most steel users. And it will result in the most competitive steel market since the immediate post-war period.

Shipments during the injunction will supply little more than emergency supplies for most steel consumers. Only a few will be able to get enough steel for full production; none will be able to rebuild inventories.

**Slower Than Hoped**—The return to production and normal shipments will be slower than the optimistic reports issued from the mills shortly after the injunction was upheld.

The threat of a new strike will hang over all steel mill operations and the possibility of another shutdown will be a foremost considera-

tion in all production plans.

**What's Ahead**—These developments can be expected even after the T-H injunction:

Layoffs and cutbacks in major consuming industries will continue for a minimum of four weeks.

The scramble for steel from all sources will be undiminished. Premium prices for conversion and broker steel will still be paid. Conversion for cold-rolled sheet will continue for possibly six months.

Steel users will be up against double competition. Big consumers will use every pressure possible to obtain first and largest shipments. Producers will be under equal pressure to channel scarce ingots to the most profitable items. (These include cold-rolled sheets, stainless, tinplate and galvanized.)

**Recovery Timetable**—A general timetable for the industry's recovery runs like this:

Twelve days to three weeks to reach 80 pct of ingot capacity.

Four weeks to get any semblance of tonnage shipments.

Six to seven weeks for a balanced shipment schedule.

Nine months before the last vestiges of steel tightness are gone from the market.

**Production Headaches**—Mills face a problem of mammoth proportions in returning to production. Damage to openhearth and blast furnaces can not be determined, but it is substantial.

For some days, openhearth will be cold-charged, that is, with pig iron and scrap until blast furnaces bring out their first quality iron. This will mean a slower and lower rate of production by openhearth. Some blast furnaces will not be started up immediately, but will undergo major overhauls. If a settlement does not seem likely, they may not be put into operation until a contract is signed.

To make matters worse, an ore shortage threatens. In Chicago, where the pinch is greatest, at least one mill faces cutbacks in March. Shipments before the freezeup can't stave off the shortage.

## Steel Output, Operating Rates

<b>Production</b>	This Week	Last Week	Month Ago	Year Ago
(Net tons, 000 omitted)	849	368	368	2,011
<b>Ingot Index</b>				
(1947-1949=100)	52.8	22.9	22.9	125.2
<b>Operating Rates</b>				
Chicago	40.0	5.0	5.5	88.0
Pittsburgh	30.0	4.0	4.0	68.5
Philadelphia	25.0	12.0	12.0	70.0
Valley	30.0	10.0	10.0	59.5
West	20.0	16.0*	0.0	80.0
Cleveland	22.0	0.0	0.0	71.0
Detroit	40.0	24.0	25.0	90.0
Buffalo	78.0	0.0	0.0	78.0
South Ohio River	90.0	86.0*	73.0	89.0
South	12.0	12.5	12.0	56.5
Upper Ohio River	67.5	57.0	55.0	88.0
St. Louis	92.0	93.0*	108.5	92.0
<b>Aggregate</b>	30.0	13.0	13.0	74.5

\*Revised

## Prices At a Glance

(Cents per lb unless otherwise noted)

	This Week	Week Ago	Month Ago	Year Ago
<b>Composite price</b>				
Finished Steel, base	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	\$66.41	\$66.41	\$66.41	\$66.41
Scrap No. 1 hvy (Gross ton)	\$46.17	\$46.17	\$44.50	\$42.33
No. 2 bundles	\$31.50	\$31.50	\$30.17	\$29.50
<b>Nonferrous</b>				
Aluminum ingot	26.80	26.80	26.80	26.80
Copper, electrolytic	30-33	30-31.5	30-31.50	29.00
Lead, St. Louis	12.80	12.80	12.80	12.80
Magnesium	36.00	36.00	36.00	36.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Tin, Straits, N. Y.	101.375	101.25	102.125	99.75
Zinc, E. St. Louis	12.50	12.50	12.00	11.50

# Wreckers Are a Steel Source

**Now is a good time to look to wrecking firms as a source for structurals and other steel.**

**Much of the steel in buildings being torn down can to re-used.**

■ One overlooked source of steel—wrecking firms—are now getting attention because of the steel shortage. Wreckers are now making efforts to save more steel for re-use rather than scrapping it. Purchasing agents who handle demolition contracts for their firms are hoping that demand for steel for re-use will increase their return.

"We are getting many calls from fabricators who will use certified welds to fabricate steel which ordinarily comes from warehouses," says Irving L. Arnold, president of Arnold-Roblin-Luntz Co., Cleveland. "Because of the shortage we are putting more emphasis into

saving usable structurals."

"We are also furnishing much pipe, valves and copper bus bars and fabricated columns which would normally be scrapped. We expect the trend will continue for at least 4-5 months."

Normally about 75-80 pct of the steel tonnage from demolished buildings goes into scrap. There is little demand for older structurals. Older 18 in. I-beams, for instance, weighed 60-70 lbs. per ft. But newer ones weighing 54 lbs. will support the same strength. So buildings would have to be designed specifically for used beams.

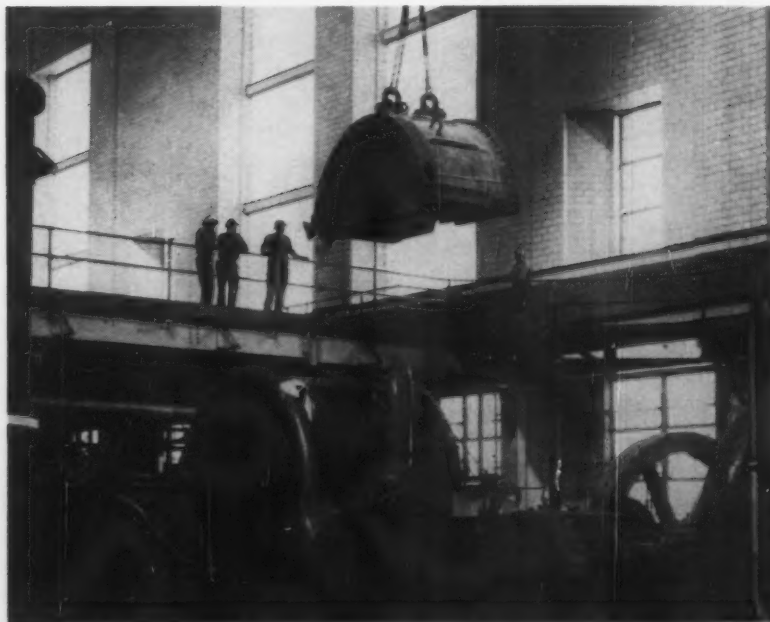
ARL's current major job—demolishing a Cleveland Electric Illuminating Co. power plant—indicates how technology and high labor costs have made scrap of good machines. When built, the plant was one of the largest in the

country. It housed 7 turbo generators of varying sizes. They weighed from 650 to 725 tons each. Although ARL has made exhaustive efforts to sell them for re-use at about \$250,000, there are no takers. Equivalent powered new ones cost from \$1.1 million to \$1.3 million. But they weigh only about 300 to 400 tons. Newer ones are also more efficient due to higher operating temperatures and pressures and rotate twice as fast. So turbines will be scrapped.

This power plant will yield about 15,000 to 16,000 tons of steel scrap and 500 tons of copper. About 75-80 pct of the steel will be scrapped. Re-usable items sold are 16 power transformers of 750 kva, 100 tons of motors sold to re-conditioning shops and 50 tons of coal conveyors sold to materials handling firms which can adapt them to new installations.

Occasionally wreckers can find a customer for an entire building. As scrap they are worth currently \$30-35 a ton. But for re-erection they go up to \$100 per ton or more. In one case, Mr. Arnold was able to move a complete metal-clad steel mill building from Michigan to Illinois for re-erection. Stainless steel boiler tubes are generally re-used with reconditioning and new fitting of ends.

Purchasing departments of firms are primarily interested in getting the building out of the way. They will furnish original blueprints, if available. Wrecking estimators will work up to a month over these preparing bids. In most cases the whole building is sold for dismantling in a package deal. But often demolition will be on a single contract, with separate bids taken for scrap. Wreckers main concern is tearing it down.



**USED STEEL:** Wrecking firms can help out in the critical steel shortage. Much of the steel from demolished buildings can be reused.

# RYERSON FOR METALWORKING MACHINERY

## 375-ton rolls... 7½-lb. punches... everything in between

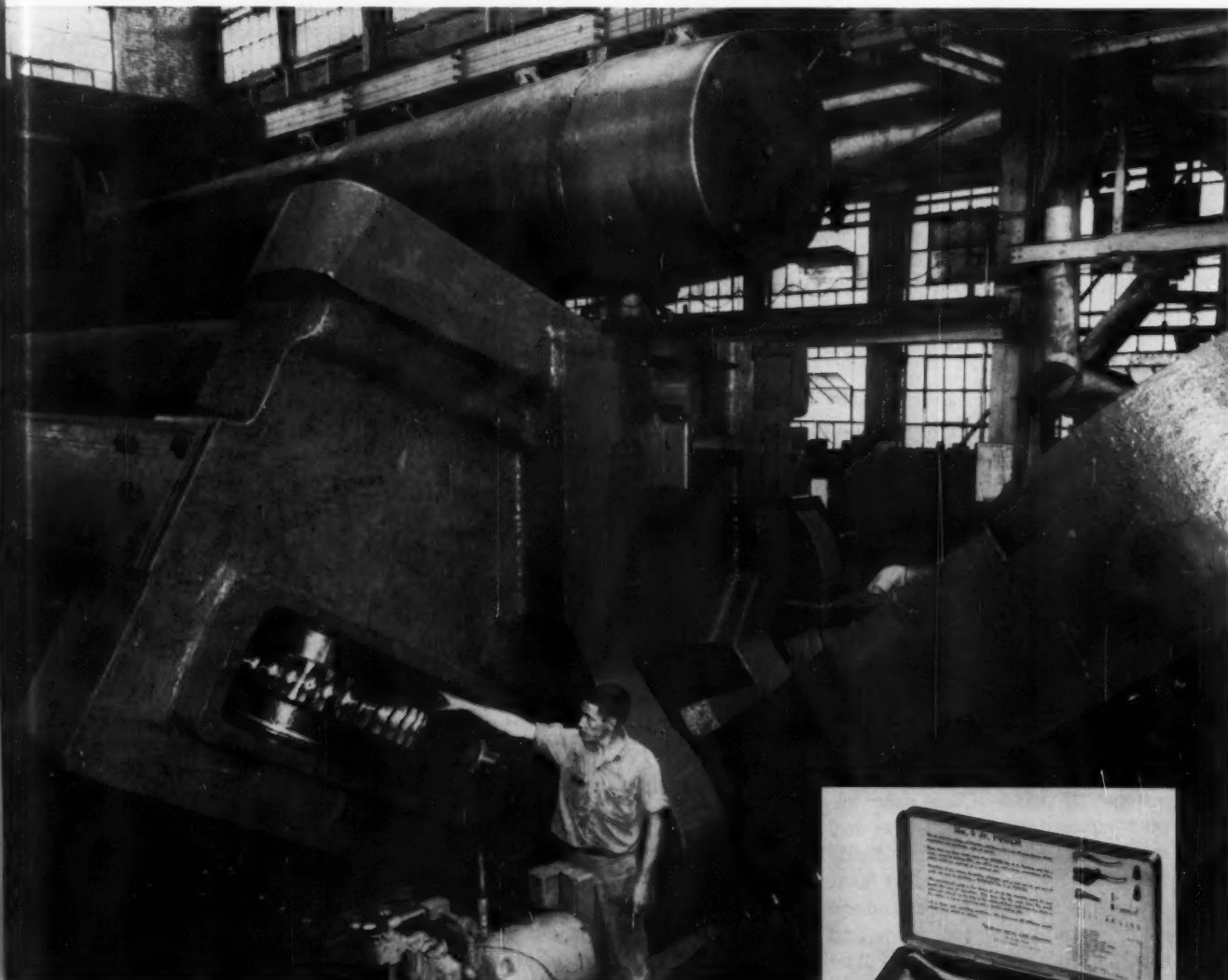
Whatever you need in metalworking machinery Ryerson can supply. Over 3800 types and models are available—everything from this huge bending roll to the little hand punch pictured below.

Ryerson supplies equipment produced by almost a hundred of the nation's top manufacturers—and offers you unbiased recommendations based on the experience of 117 years' service to metal fabricators. In addition, you get a double guarantee of satisfaction

and greater continuing interest because of your steel and aluminum buying potential.

So next time you are considering the purchase of new equipment, get in touch with the machinery specialist at your nearby Ryerson plant.

The Ryerson line includes machinery for: bending, braking, drilling, forming, hoisting, pressing, punching, rolling, sawing, shearing, threading and welding. Also a special line of material handling equipment.



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STEEL • ALUMINUM • PLASTICS • METALWORKING MACHINERY  
NATION'S MOST COMPLETE SERVICE CENTERS IN PRINCIPAL CITIES COAST TO COAST

# Buyer Problems Are Just Beginning

**Despite Taft-Hartley start-up, steel users are due for continued headaches.**

**How much steel they get depends on many factors: Mill division of ingots among products, and quota setups.**

■ Forecast for steel users: Tough buying problems will continue.

The competition for steel will keep the market rough and tumble for many months. Buyers face many obstacles.

Customers will be fighting fiercely for prime delivery space on mill order books. The mills will try to fill orders entered before the strike, or in its opening months.

**Quotas Set Up**—But some mills have not officially entered orders received beyond the three-month mark. From that point users will be on a quota basis. How much steel a buyer gets will depend on many factors. Mills will examine orders in the light of buying history and past tonnage patterns.

**Ingot Division**—Users face another squeeze. How much steel they receive depends on how mills divide ingots among various product lines. Customers for products in tightest supply—cold-rolled and galvanized sheet, tinplate and stainless—will be the most anxious for steel. These are products on which mill profit margins are greatest.

Other problems will create delays. The strike has thrown together demands which are normally spaced out. For example, automotive demand for cold-rolled sheet is

usually greatest in the fourth quarter. It then tapers off in the first quarter.

Hot-rolled sheet demand for tinplate mills, however, starts building up in the fourth quarter. It generally reaches a peak in the first quarter. But, with the strike, these two peak demand periods are being pushed together.

**More Premium Prices** — Users can't expect the Taft-Hartley start-up (or an eventual strike settlement) to free them from paying premium prices. Steel shipments during the injunction period won't permit any build-up of steel stocks.

So buyers will be forced to meet broker prices for many more months. They will have to continue efforts to line up conversion tonnage. And they will be on the lookout for foreign steel.

**Sheet and Strip**—Mills now starting up will fill orders placed before the strike or in its early stages. Then users will go on a quota basis. Some mills estimate it will be February before order books are back to normal.

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## PURCHASING AGENT'S CHECKLIST

Big, new markets for metals may be opened by construction ideas of comprehensive designer R. Buckminster Fuller. P. 117

How to organize a distribution cost analysis program. P. 122

Backlogs of machine tool builders are high, but sales outlook is currently cloudy. P. 141

Mills producing during the strike are running behind on orders. Backlog at one **Eastern** mill has climbed from three to four weeks. In an effort to get current, the mill blanked out January tonnages. Customers are glad to get whatever sheet is available. They are often living from one shipment to the next.

**Stainless**—Mill backlogs are three months or more of capacity production. New orders keep arriving at a strong rate. One **Pittsburgh** mill estimates it will be second quarter 1960 before stainless buyers can rebuild inventories.

**Fabricated Steel** — Before the T-H injunction was applied, the strike had crippled many construction projects. Backlog of one large fabricator moved out from three to seven months during the strike. Despite this, the market still contains soft spots. Public construction lettings are slim in some areas. In addition competition among bidders is still very cut-throat.

**Iron Ore** — Mills are looking ahead to ore shortages this winter and next spring. One **Midwest** mill admits ore problems could bring a slowdown in March. This producer will line up scrap for openhearth charge if ore dwindles.

Meanwhile, Great Lakes ore boats are making every effort to get in as much tonnage as possible before the winter shutdown. "Almost all the boats will be out as long as the weather permits," says Vice Admiral Lyndon Spencer, of the Lake Carriers Assn., **Cleveland**. Several boats were sent from **Milwaukee** to **Chicago** and unloaded two days after the injunction was granted.

Ore shipments during October were only one million tons compared with the 8.4 million tons shipped in October 1958. Through October, the **Superior** District shipped 38.2 million tons this year, contrasted with 48.2 million tons a year ago.

**Foreign Steel** — Brokers admit their stocks are low. Some are entirely out of the market.

# COMPARISON OF PRICES

(Effective Nov. 10, 1959)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (\*).

	Nov. 10 1959	Nov. 3 1959	Oct. 13 1959	Nov. 11 1958
<b>Flat-Rolled Steel: (per pound)</b>				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.27¢	6.27¢	6.27¢	6.27¢
Galvanized sheets (10 ga.)	6.37¢	6.37¢	6.37¢	6.37¢
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.42¢	7.42¢	7.42¢	7.42¢
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	13.55	13.55	13.55	13.55
Stainl's C-R strip (No. 302)	52.00	52.00	52.00	52.00
<b>Tin and Terneplate: (per base box)</b>				
Tinplate (1.50 lb.) cokes	\$10.65	\$10.65	\$10.65	\$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
<b>Bars and Shapes: (per pound)</b>				
Merchant bar	5.67¢	5.67¢	5.67¢	5.67¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.72¢	6.72¢	6.72¢	6.72¢
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.00
Wrought iron bars	14.90	14.90	14.90	14.90
<b>Wire: (per pound)</b>				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
<b>Rails: (per 100 lb.)</b>				
Heavy rails	\$5.75	\$5.75	\$5.75	\$5.75
Light rails	6.72¢	6.72¢	6.72¢	6.72¢
<b>Semifinished Steel: (per net ton)</b>				
Rerolling billets	\$80.00	\$80.00	\$80.00	\$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
<b>Wire Rods and Skelp: (per pound)</b>				
Wire rods	6.40¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
<b>Finished Steel Composite: (per pound)</b>				
Base price	6.19¢	6.19¢	6.19¢	6.19¢

## Finished Steel Composite

Weighted index based on steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

## Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

## Steel Scrap Composites

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

	Nov. 10 1959	Nov. 3 1959	Oct. 13 1959	Nov. 11 1958
<b>Pig Iron: (per gross ton)</b>				
Foundry, del'd Phila.	\$70.57	\$70.57	\$70.57	\$70.57
Foundry, Southern Cin'ti	73.87	73.87	73.87	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.07	70.07	70.07	70.07
Basic, Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese, 74-76 pct Mn, cents per lb $\frac{1}{2}$	12.25	12.25	12.25	12.25
<b>Pig Iron Composite: (per gross ton)</b>				
Pig iron	\$66.41	\$66.41	\$66.41	\$66.41
<b>Scrap: (per gross ton)</b>				
No. 1 steel, Pittsburgh	\$47.50	\$47.50	\$46.50	\$45.50
No. 1 steel, Phila. area	46.50	46.50	44.50	39.00
No. 1 steel, Chicago	44.50	44.50	42.50	42.50
No. 1 bundles, Detroit	42.50*	41.50	39.50	37.50
Low phos., Youngstown	51.50*	49.50	47.50	46.50
No. 1 mach'y cast, Pittsburgh	55.50	55.50	53.50	51.50
No. 1 mach'y cast, Phila.	53.50	53.50	53.50	49.50
No. 1 mach'y cast, Chicago	64.50	64.50	63.50	53.50
<b>Steel Scrap Composite: (per gross ton)</b>				
No. 1 hvy. melting scrap	\$46.17	\$46.17	\$44.50	\$42.33
No. 2 bundles	31.50	31.50	30.17	29.50
<b>Coke, Connellsville: (per net ton at oven)</b>				
Furnace coke, prompt	\$14.50-15.50	\$14.50-15.50	\$14.50-15.50	14.50
Foundry coke, prompt	18.50	18.50	18.50	18-18.50
<b>Nonferrous Metals: (cents per pound to large buyers)</b>				
Copper, electrolytic, Conn.	30-33	30-31.50	30-31.50	29.00
Copper, Lake, Conn.	33.00	31.50	31.50	29.00
Tin, Straits, N. Y.	101.375†	101.25	102.125	99.75
Zinc, East St. Louis	12.50	12.50	12.00	11.50
Lead, St. Louis	12.80	12.80	12.80	12.80
Aluminum, virgin ingot	26.80	26.80	26.80	26.80
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. \*\* Revised.

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# Market Awaits T-H Scrap Action

**The T-H injunction failed to send the market into action. But prices stayed firm.**

**First movement of scrap was confined to material held by mills and brokers for shipment.**

■ The market held its breath this week, awaiting the first post-strike buys that would point the direction of price trends.

The first few days after the Taft-Hartley injunction brought out nothing but more speculation and a few token buys that generally were close to or right on quoted prices.

**Bulls Prevail** — In most areas, the bulls prevailed. But here and there, some hints of apprehension appeared. Prices remained firm and even went up here and there on small buys or broker activity.

Most of the scrap movement was prompted by shipping releases of scrap that was owned by mills or brokers and was earmarked for prompt shipment.

**Pittsburgh** — Prices were unchanged in the first days of mill startup. A mill order just before the startup confirmed the price of No. 2 bundles at \$34. There were no new orders in the early period of the T-H injunction. However, shipping releases started a rapid flow of scrap to the mills. Between 50,000 and 60,000 tons are due in the Pittsburgh area. Most is owned by brokers or mills for prompt delivery. The big market test will come with new orders.

**Chicago**—The market froze this week as scrap collections continued to drop and mills began to pressure for lower prices. The price line appeared solid. New sales confirm existing price levels, but quantities available for sale continue to shrink. Scrap producers are laying down a greater percentage of their monthly output, expecting further price rises.

**Philadelphia** — Dealers and brokers are waiting for mills to put in new orders. Some delay is expected until mills get operations squared away. Meanwhile, continued strong export is supporting the market. Scrap supplies are ample, but industrial scrap has dwindled. No. 1 busheling and low phos dropped \$2 on the basis of a local buy.

**New York** — At press time, resumption of steel mill operations had not yet brought any sharp rise in scrap prices or orders. Some mills instructed brokers to ship material held for them, but this did not cause a price change. However, cast prices rose \$2.

**Detroit**—There's no real trading yet. Dealers and brokers are waiting for mills to get going. Estimates are it will take another week before there's any real action. But prices continue to rise and stainless made its first climb in months.

**Cleveland** — Mills started taking in committed scrap swiftly in Cleveland as the strike ended, but there was little brewing on new orders. Electric grades have jumped another \$2 on higher broker buying prices to fill older orders. Open-

hearth grades are expected to follow when and if new orders are placed. Railroad specialties shot up \$5 on bidding for small lots. Foundry steel has also gone up \$4 as a local dealer paid \$46 plus a \$2 springboard.

**St. Louis**—Prices appear to have reached at least a temporary peak. Mills are not anxious to buy and dealer supplies are ample. Some grades shifted in price, with turnings showing significant gains.

**Cincinnati** — With a sustained good operating rate during the strike, the back-to-work order didn't change much in the area. Eventually local consumers probably will have to raise their price to meet Pittsburgh demand. Rail prices have shot up because of competition with re-rollers for small lots offered.

**Birmingham**—The market continues strong and fairly active. A large Birmingham electric furnace hiked its price \$2 a ton on some items. Brokers and dealers, for the most part, are bullish but some believe the market may have reached its peak. Cast prices jumped \$1.50.

**Buffalo** — Although mills have not bought yet, prices are up \$3 on appraisal for steelmaking grades and turnings. Cast prices are up \$2 on basis of a sale.

**Boston** — A strengthening of openhearth prices followed the T-H injunction here. It was not based on any mill sale, but the market has definitely firmed.

**West Coast**—Los Angeles prices jumped \$2 per ton for No. 1 and No. 2 heavy melting and \$5 to \$7 per ton for No. 1 bundles. Mills are complaining about quality and rejections are running as high as 50 pct.

**Houston** — The market remains unchanged with the trade awaiting first purchases after the injunction. Export remains strong with export brokers paying well over domestic prices.

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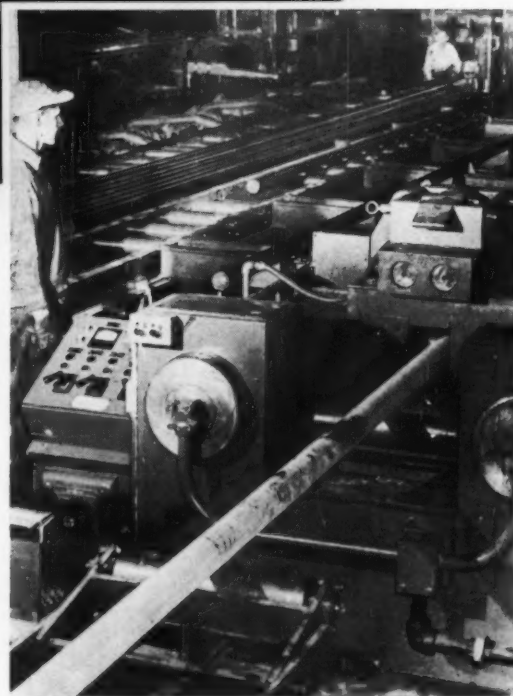
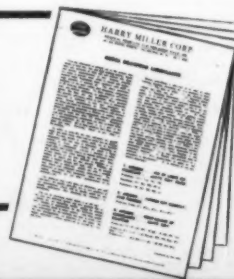


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# SCRAP PRICES

(Effective Nov. 10, 1959)

## Pittsburgh

No. 1 hvy. melting	\$47.00 to \$48.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	48.00 to 49.00
No. 1 factory bundles	53.00 to 54.00
No. 2 bundles	35.00 to 34.00
No. 1 busheling	47.00 to 48.00
Machine shop turn.	24.00 to 25.00
Shoveling turnings	31.00 to 32.00
Cast iron borings	30.00 to 31.00
Low phos. punch'g plate	55.00 to 56.00
Heavy turnings	40.00 to 41.00
No. 1 RR hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	59.00 to 60.00
Rails 2 ft and under	64.00 to 65.00
RR specialties	59.00 to 60.00
No. 1 machinery cast.	55.00 to 56.00
Cupola cast.	51.00 to 52.00
Heavy breakable cast.	49.00 to 50.00
Stainless	
18-8 bundles and solids	235.00 to 240.00
18-8 turnings	115.00 to 120.00
430 bundles and solids	130.00 to 135.00
430 turnings	60.00 to 65.00

## Chicago

No. 1 hvy. melting	\$44.00 to \$45.00
No. 2 hvy. melting	41.00 to 42.00
No. 1 dealer bundles	44.00 to 45.00
No. 1 factory bundles	50.00 to 51.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	44.00 to 45.00
Machine shop turn.	26.00 to 27.00
Mixed bor. and turn.	28.00 to 29.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	28.00 to 29.00
Low phos. forge crops	58.00 to 59.00
Low phos. punch'g plate, 1/2 in. and heavier	55.00 to 56.00
Low phos. 2 ft and under	53.00 to 54.00
No. 1 RR hvy. melting	50.00 to 51.00
Scrap rails, random lgth.	59.00 to 60.00
Revolting rails	67.00 to 68.00
Rails 2 ft and under	63.00 to 64.00
Angles and splice bars	58.00 to 59.00
RR steel car axles	60.00 to 61.00
RR couplers and knuckles	55.00 to 56.00
No. 1 machinery cast.	54.00 to 55.00
Cupola cast.	57.00 to 58.00
Cast iron wheels	51.00 to 52.00
Malleable	65.00 to 66.00
Stove plate	53.00 to 54.00
Steel car wheels	56.00 to 57.00
Stainless	
18-8 bundles and solids	220.00 to 225.00
18-8 turnings	120.00 to 125.00
430 bundles and solids	130.00 to 135.00
430 turnings	60.00 to 65.00

## Philadelphia Area

No. 1 hvy. melting	\$46.00 to \$47.00
No. 2 hvy. melting	40.00 to 41.00
No. 1 dealer bundles	48.00 to 49.00
No. 2 bundles	30.00 to 31.00
No. 1 busheling	46.00 to 47.00
Machine shop turn.	24.00 to 25.00
Mixed bor. and turn.	23.00 to 24.00
Cast iron borings	23.00 to 24.00
Shoveling turnings	27.00 to 28.00
Clean cast. chem. borings	30.00 to 31.00
Low phos. 5 ft and under	47.00 to 48.00
Low phos. 2 ft punch'g.	49.00 to 50.00
Elec. furnace bundles	49.00 to 50.00
Heavy turnings	34.00 to 35.00
RR specialties	49.00 to 50.00
Rails 18 in. and under	67.00 to 68.00
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	47.00 to 48.00
Cast iron car wheels	48.00 to 49.00
Malleable	67.00 to 68.00
No. 1 machinery cast.	53.00 to 54.00

## Cincinnati

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$38.00 to \$39.00
No. 2 hvy. melting	34.00 to 35.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	28.00 to 29.00
Machine shop turn.	21.00 to 22.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	23.00 to 24.00
Low phos. 18 in. and under	49.00 to 50.00
Rails, random length	56.00 to 57.00
Rails, 18 in. and under	64.00 to 65.00
No. 1 cupola cast.	49.00 to 50.00
Hvy. breakable cast.	44.00 to 45.00
Drop broken cast.	59.00 to 60.00

## Youngstown

No. 1 hvy. melting	\$46.00 to \$47.00
No. 2 hvy. melting	39.00 to 40.00
No. 1 dealer bundles	47.00 to 48.00
No. 2 bundles	31.50 to 32.50
Machine shop turn.	21.50 to 22.50
Shoveling turnings	26.50 to 27.50
Low phos. plate	51.00 to 52.00

## Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

## Cleveland

No. 1 hvy. melting	\$42.50 to \$43.50
No. 2 hvy. melting	35.50 to 36.50
No. 1 dealer bundles	43.50 to 44.50
No. 1 factory bundles	49.00 to 50.00
No. 2 bundles	28.00 to 29.00
No. 1 busheling	46.50 to 47.50
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	24.00 to 25.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	24.00 to 25.00
Cut structural & plates, 2 ft & under	50.00 to 51.00
Drop forge flashings	42.50 to 43.50
Low phos. punch'g plate	46.50 to 47.50
Foundry steel, 2 ft & under	45.00 to 46.00
No. 1 RR hvy. melting	47.50 to 48.50
Rails 2 ft and under	65.00 to 66.00
Rails 18 in. and under	66.00 to 67.00
Steel axle turnings	24.00 to 25.00
Railroad cast.	60.00 to 61.00
No. 1 machinery cast.	56.00 to 57.00
Stove plate	51.00 to 52.00
Malleable	67.00 to 68.00
Stainless	
18-8 bundles	225.00 to 235.00
18-8 turnings	115.00 to 120.00
430 bundles	120.00 to 125.00

## Buffalo

No. 1 hvy. melting	\$39.00 to \$40.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 busheling	39.00 to 40.00
No. 1 dealer bundles	39.00 to 40.00
No. 2 bundles	20.00 to 21.00
Machine shop turn.	20.00 to 21.00
Mixed bor. and turn.	21.00 to 22.00
Shoveling turnings	24.00 to 25.00
Cast iron borings	21.00 to 22.00
Low phos. plate	44.00 to 45.00
Structurals and plate, 2 ft and under	45.00 to 46.00
Scrap rails, random lgth.	43.00 to 44.00
Rails 2 ft and under	53.00 to 54.00
No. 1 machinery cast.	53.00 to 54.00
No. 1 cupola cast.	49.00 to 50.00

## St. Louis

No. 1 hvy. melting	\$40.00 to \$41.00
No. 2 hvy. melting	37.00 to 38.00
No. 1 dealer bundles	46.50 to 47.50
No. 2 bundles	27.00 to 28.00
Machine shop turn.	22.50 to 23.50
Shoveling turnings	24.00 to 25.00
Cast iron borings	25.00 to 26.00
No. 1 RR hvy. melting	48.00 to 49.00
Rails, random lengths	54.00 to 55.00
Rails, 18 in. and under	59.00 to 60.00
Angles and splice bars	50.00 to 51.00
RR specialties	51.50 to 52.50
Cupola cast.	54.00 to 55.00
Heavy breakable cast.	45.00 to 46.00
Stove plate	45.00 to 46.00
Cast iron car wheels	48.50 to 49.50
Revolting rails	65.00 to 66.00
Unstripped motor blocks	45.00 to 46.00

## Birmingham

No. 1 hvy. melting	\$37.00 to \$38.00
No. 2 hvy. melting	32.00 to 33.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	25.00 to 26.00
Shoveling turnings	28.00 to 29.00
Cast iron borings	14.00 to 15.00
Electric furnace bundles	42.00 to 43.00
Elec. furnace, 3 ft & under	40.00 to 41.00
Bar crops and plate	46.00 to 47.00
Structural and plate, 2 ft.	46.00 to 47.00
No. 1 RR hvy. melting	42.00 to 43.00
Scrap rails, random lgth.	51.00 to 52.00
Rails, 18 in. and under	56.00 to 57.00
Angles and splice bars	49.00 to 50.00
Revolting rails	61.00 to 62.00
No. 1 cupola cast.	55.00 to 56.00
Stove plate	55.00 to 60.00
Cast iron car wheels	45.00 to 46.00
Unstripped motor blocks	42.00 to 43.00

## New York

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$37.00 to \$38.00
No. 2 hvy. melting	33.00 to 34.00
No. 2 dealer bundles	22.00 to 23.00
Machine shop turnings	19.00 to 20.00
Mixed bor. and turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	25.00 to 26.00
No. 1 machinery cast.	20.00 to 22.00
Mixed yard cast.	39.00 to 40.00
Heavy breakable cast.	39.00 to 40.00
Stainless	
18-8 prepared solids	200.00 to 205.00
18-8 turnings	85.00 to 90.00
430 prepared solids	85.00 to 90.00
430 turnings	20.00 to 25.00

## Detroit

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$40.00 to \$41.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	42.00 to 43.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	40.00 to 41.00
Drop forge flashings	40.00 to 41.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	22.00 to 23.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	23.00 to 24.00
Heavy breakable cast.	41.00 to 42.00
Mixed cupola cast.	49.00 to 50.00
Automotive cast.	55.00 to 56.00
Stainless	
18-8 bundles and solids	205.00 to 210.00
18-8 turnings	80.00 to 85.00
430 bundles and solids	100.00 to 105.00

## Boston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$35.00 to \$36.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 dealer bundles	37.00 to 38.00
No. 2 bundles	25.00 to 26.00
No. 1 busheling	35.00 to 36.00
Machine shop turn.	12.00 to 13.00
Shoveling turnings	15.00 to 16.00
Clean cast. chem. borings	18.50 to 19.50
No. 1 machinery cast.	41.00 to 42.00
Mixed cupola cast.	39.00 to 40.00
Heavy breakable cast.	35.00 to 36.00

## San Francisco

No. 1 hvy. melting	\$36.00
No. 2 hvy. melting	33.00
No. 1 dealer bundles	33.00
No. 2 bundles	22.00
Machine shop turn.	17.00
Cast iron borings	17.00
No. 1 cupola cast.	47.00

## Los Angeles

No. 1 hvy. melting	\$40.00
No. 2 hvy. melting	38.00
No. 1 dealer bundles	\$38.00 to 40.00
No. 2 bundles	21.00
Machine shop turn.	16.00
Shoveling turnings	18.00
Cast iron borings	18.00
Elec. turn. 1 ft and under (foundry)	47.00 to 48.00
No. 1 cupola cast.	47.00 to 48.00

## Seattle

No. 1 hvy. melting	\$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	22.00
No. 1 cupola cast.	36.00
Mixed yard cast.	36.00

## Hamilton, Ont.

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$32.25
No. 2 hvy. melting	28.25
No. 1 dealer bundles	32.25
No. 2 bundles	24.00
Mixed steel scrap	24.25
Bush, new fact, prep'd.	32.25
Bush, new fact, unprep'd	26.25
Machine shop turn.	14.00
Short steel turn.	17.00
Mixed bor. and turn.	13.00
Rails, reeling	37.00
Cast scrap	\$46.50 to 48.00

## Houston

Brokers buying prices per gross ton on cars:	
No. 1 hvy. melting	\$34.00
No. 2 hvy. melting	31.00
No. 2 bundles	20.00
Machine shop turn.	16.00
Shoveling turnings	20.00
Cut structural plate	
2 ft & under	\$48.00 to 49.00
Unstripped motor blocks	40.50 to 40.50
Cupola cast.	46.00 to 47.00
Heavy breakable cast.	34.00 to 35.00



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# What T-H in Steel Means to Copper

**Copper men are taking a new look at their own situation in light of the Taft-Hartley injunction in steel.**

**There's more chance of a settlement now than there has been in some time.**

■ A copper settlement may not be too far off. There's no mad rush for the bargaining tables. But a subtle shift in attitudes on both sides is taking place.

A big factor is the temporary disposal of the steel strike. Much as copper men have been talking about "their own settlement," they have been keeping one eye on steel.

**T-H for Copper?**—Some copper people are now wondering whether a Taft-Hartley injunction might be called in their industry. With steel going back to work, demand for copper is sure to pick up. And the court testing has already been done in steel.

Last week Sen. Frank Moss (D., U.) asked that President Eisenhower set up an impartial board to recommend a settlement basis. This has added fuel to the fire.

**Three-Fourths Closed**—A check of the industry shows over three-fourth of U. S. mine capacity closed, well over 90 pct of smelter capacity out, and just about 70 pct or refinery output down.

The key is the refinery picture. Through October, based on output in the first half, the refinery strike cut U. S. copper output by about 260,000 tons, while shut smelters

cost about 252,000 tons, and mines only 165,000 tons.

But the argument that 30 pct of refinery capacity is still working, while top priority defense needs take only 6 pct of total output will not hold up.

**Defense Factors**—Copper defense production is very widely spread over industry. Few, if any, fabricators have more than 10 pct of their total business in defense orders. Therefore, few can afford to operate a plant for just defense business. They've got to be able to get enough metal to operate past the break even point.

Some observers say the whole situation is much simpler than that. They say Kennecott is the target company of the International Union of Mine, Mill, and Smelter Workers.

Negotiations here have never been pushed hard enough to arrive at any settlement. With steel talks no longer as big a factor talks will really get serious.

**Government Action**—Meanwhile, the government may release some of its surplus Defense Production Act copper into industry pipelines as soon as enough of the industry has settled. The government is still saying "no comment," but sources say the pressure is strong, and receiving much more attention than it did a month ago.

Officially, the copper price is settling around 33¢ per lb. This is what most major sources, except Kennecott, are quoting for what little metal they have. And this is

what most fabricators are basing their prices on.

But if anyone needs metal in a hurry, the going price for copper for delivery this year is around 37¢ to 39¢ per lb. One indicator: The U. S. mint in Denver had to pay 38.9¢ per lb for copper for delivery in December.

## Zinc

A plea for protection against imports of sheet zinc is under study by the U. S. Tariff Commission.

The domestic industry appealed for higher tariffs because they say rising imports of sheet zinc are endangering U. S. production. The industry asked for the maximum 50 pct increase, which would boost the duty from 31.3 pct to 46.9 pct.

Producers complain that some 900 tons of sheet zinc were imported into this country last year, mostly from West Germany, Belgium, Yugoslavia, and the United Kingdom. Imports accounted for only 1 pct of the U. S. market seven years ago, but have risen to 21 pct now, they say.

Tin prices for the week: Nov. 4—101.25; Nov. 5—101.25; Nov. 6—101.25; Nov. 9—101.25; Nov. 10—101.375.\*

\*Estimate.

## Primary Prices

(cents per lb)	current price	last price	date of change
Aluminum pig	24.70	24.00	8/1/58
Aluminum ingot	26.80	26.10	8/1/58
Copper (E)	30-33	30-31.50	11/6/58
Copper (CS)	33.00	30.00	8/1/58
Copper (L)	33.00	31.50	11/6/58
Lead, St. L.	12.80	11.80	8/24/58
Lead, N. Y.	13.00	12.00	8/24/58
Magnesium ingot	36.00	34.50	8/13/58
Magnesium pig	35.25	33.75	8/13/58
Nickel	74.00	64.50	12/4/58
Titanium sponge	180-190	182-182	8/1/58
Zinc, E. St. L.	12.50	12.5-13	11/2/58
Zinc, N. Y.	13.00	13-13.5	11/2/58

**ALUMINUM:** 99% Ingot **COPPER:** (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. **LEAD:** common grade. **MAGNESIUM:** 99.8% pig Velasco, Tex. **NICKEL:** Port Colborne, Canada. **ZINC:** prime western. **TIN:** See above; Other primary prices, pg. 216.

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# NONFERROUS PRICES

## MILL PRODUCTS

(Cents per lb unless otherwise noted)

### ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.032	.081	.136 .249	.250- 3
1100, 3003.....	45.7	43.8	42.8	43.3
5052.....	53.1	48.4	46.9	46.0
6061-0.....	50.1	45.7	43.9	44.9

### Extruded Solid Shapes

Factor	6063 T-5	6063 T-6
6-8.....	42.7-44.2	51.1-54.8
12-14.....	42.7-44.2	52.0-56.5
24-26.....	43.2-44.7	62.8-67.5
36-38.....	46.7-49.3	86.9-90.5

### Screw Machine Stock—2011-T-3

Size*	3/4	3/4-3/8	3/4-1	1 1/4-1 1/2
Price.....	62.0	61.2	59.7	57.3

### Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length*→	72	96	120	144
.019 gage.....	\$1.411	\$1.884	\$2.353	\$2.823
.024 gage.....	1.762	2.349	2.937	3.524

## MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

### Sheet and Plate

Type↓	Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand, Grade.....			67.9	69.0	77.9	108.1
AZ31B Spec.....			93.3	95.7	108.7	171.3
Tread Plate.....			70.6	71.7		
Tooling Plate.....	73.0					

### Extruded Shapes

Factor→	6-8	12-14	24-26	36-38
Comm. Grade, (AZ31C).....	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B).....	84.6	85.7	90.6	104.2

### Alloy Ingot

AZ91B (Die Casting).....	37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting) 40.75 (Velsco, Tex.)	

## NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

"A" Nickel Monel	Inconel
Sheet, CR.....	138
Strip, CR.....	124
Rod, bar, HR.....	107
Angles, HR.....	107
Plates, HR.....	130
Seamless tube.....	157
Shot, blocks.....	87

## COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper.....	56.13	.....	54.36	57.32
Brass, Yellow.....	49.82	50.36	49.76	53.23
Brass, Low.....	52.78	53.32	52.72	56.09
Brass, R L.....	53.83	54.37	53.77	57.14
Brass, Naval.....	54.37	.....	48.18	57.78
Muntz Metal.....	52.45	.....	47.76	.....
Comm. Br.....	55.42	55.96	55.36	58.48
Mang. Br.....	58.11	.....	51.71	.....
Phos. Br. 5%.....	76.09	.....	77.19	.....

Free Cutting Brass Rod..... 35.31

## TITANIUM

(Base prices f.o.b. mill)

Sheet and strip, commercially pure, \$7.25-\$8.50; alloy, \$13.40-\$17.00. Plate, HR, commercially pure, \$5.25-\$6.00; alloy, \$8.00-\$10.00. Wire, rolled and/or drawn, commercially pure, \$5.75-\$6.25; alloy, \$7.75-\$10.00; Bar, HR or forged, commercially pure, \$4.25-\$5.00; alloy, \$4.25-\$7.50; billets, HR, commercially pure, \$3.55-\$4.10; alloy, \$3.55-\$5.75.

## PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex., 29.50  
Beryllium Aluminum 5% Be, Dollar  
per lb contained Be.....\$74.75  
Beryllium copper, per lb contained Be.....\$43.00  
Beryllium 97% lump or beads,  
f.o.b. Cleveland, Reading.....\$71.50  
Bismuth, ton lots.....\$ 2.25  
Cadmium, del'd.....\$ 1.40  
Calcium, 99.9% small lots.....\$ 4.55  
Chromium, 99.8% metallic base.....\$ 1.31  
Cobalt, 97-99% (per lb).....\$1.75 to \$1.82  
Germanium, per gm, f.o.b. Miami,  
Okla., refined.....\$3.30 to \$4.00  
Gold, U. S. Treas., per troy oz.....\$35.00  
Indium, 99.9%, dollars per troy oz.....\$ 2.25  
Iridium, dollars per troy oz.....\$75 to \$85  
Lithium, 98%.....\$11.00 to \$14.00  
Magnesium sticks, 100 to 500 lb..... 59.00  
Mercury, dollars per 76-lb flask  
f.o.b. New York.....\$221 to \$223  
Nickel oxide sinter at Buffalo, N. Y.,  
or other U. S. points of entry,  
contained nickel..... 69.60  
Palladium, dollars per troy oz.....\$20 to \$22  
Platinum, dollars per troy oz.....\$77 to \$80  
Rhodium.....\$120.00 to \$125.00  
Silver ingots (¢ per troy oz.).....91.375  
Thorium, per kg.....\$43.00  
Vanadium.....\$ 3.45  
Zirconium sponge.....\$ 5.00

## REMELTED METALS

### Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot	
No. 115.....	30.75
No. 120.....	29.25
No. 123.....	28.75
80-10-10 ingot	
No. 305.....	35.25
No. 315.....	33.00
88-10-2 ingot	
No. 210.....	44.00
No. 215.....	40.75
No. 245.....	36.00
Yellow ingot	
No. 405.....	24.75
Manganese bronze	
No. 421.....	29.25

### Aluminum Ingot

(Cents per lb del'd 30,000 lb and over)

95-5 aluminum-silicon alloys	
0.30 copper max.....	25.00-25.25
0.60 copper max.....	24.75-25.00
Piston alloys (No. 132 type).....	26.75-27.75
No. 12 alum. (No. 2 grade).....	23.50-24.00
108 alloy.....	24.00-24.50
195 alloy.....	26.50-27.50
13 alloy (0.60 copper max.).....	24.75-25.00
AXS-679 (1 pct zinc).....	23.75-24.75

## Steel deoxidizing aluminum notch bar

granulated or shot

Grade 1—95-97 1/2%.....	24.00-25.00
Grade 2—92-95%.....	22.75-23.75
Grade 3—90-92%.....	21.75-22.75
Grade 4—85-90%.....	21.25-22.25

## SCRAP METALS

### Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper.....	29	28 1/4
Yellow brass.....	22 1/2	20 1/4
Red brass.....	25 1/2	25
Comm. bronze.....	26 1/2	26
Mang. bronze.....	20 1/2	20
Free cutting rod ends.....	21 1/2	

### Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire.....	30
No. 2 copper wire.....	27
Light copper.....	24 1/2
*Refinery brass.....	25 1/2
Copper bearing material.....	24 1/2
*Dry copper content.....	

### Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire.....	30
No. 2 copper wire.....	26 1/2
Light copper.....	24
No. 1 composition.....	23
No. 1 comp. turnings.....	22 1/2
Hvy. yellow brass solids.....	16 1/2
Brass pipe.....	16
Radiators.....	18

Mixed old cast.....	14	—15
Mixed new clips.....	16 1/2	—17
Mixed turnings, dry.....	14 1/2	—15 1/2

### Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

<b>Copper and Brass</b>	
No. 1 copper wire.....	26 1/2—27
No. 2 copper wire.....	24—24 1/2
Light copper.....	22—22 1/2
Auto radiators (unsweated).....	15—15 1/2
No. 1 composition.....	19 1/2—20
No. 1 composition turnings.....	18—18 1/2
Cocks and faucets.....	15 1/2—15 3/4
Clean heavy yellow brass.....	13 1/2—14
Brass pipe.....	15 1/2—15 3/4
New soft brass clippings.....	15 1/2—16
No. 1 brass rod turnings.....	12 3/4—13 1/4

### Aluminum

Alum. pistons and struts.....	7 1/2—8
Aluminum crankcase.....	11 1/2—11 3/4
1100 (2s) aluminum clippings.....	15—15 1/2
Old sheet and utensils.....	11 1/2—11 3/4
Borings and turnings.....	7—7 1/2
Industrial castings.....	11 1/2—11 3/4
2020 (24S) clippings.....	12 1/2—13

### Zinc

New zinc clippings.....	6 1/4—6 3/4
Old zinc.....	4 1/4—4 3/4
Zinc routings.....	3—3 1/4
Old die cast scrap.....	2 1/2—2 3/4

### Nickel and Monel

Pure nickel clippings.....	52-54
Clean nickel turnings.....	40
Nickel anodes.....	52-54
Nickel rod ends.....	52-54
New Monel clippings.....	30-32
Clean Monel turnings.....	20-23
Old sheet Monel.....	26-28
Nickel silver clippings, mixed	18
Nickel silver turnings, mixed	15

### Lead

Soft scrap lead.....	8 3/4—9 1/4
Battery plates (dry).....	4 1/4—4 3/4
Batteries, acid free.....	2 1/2—2 3/4

### Miscellaneous

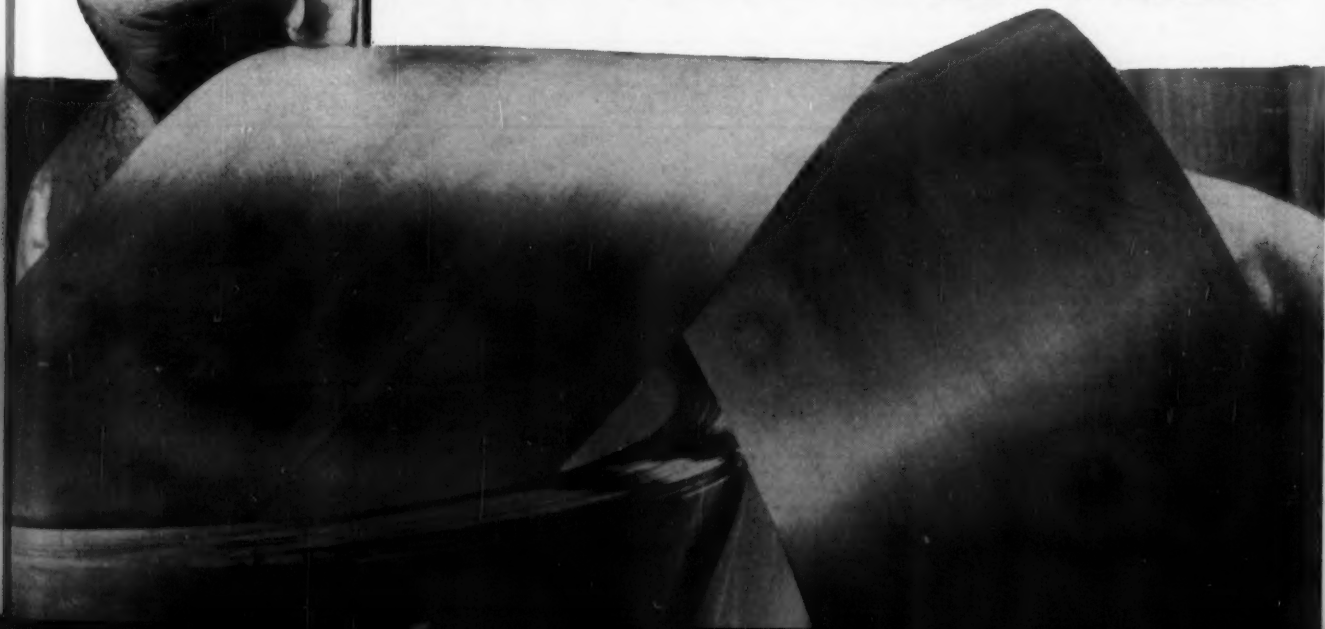
Block tin.....	77—78
No. 1 pewter.....	59—60
Auto babbitt.....	40—41
Mixed common babbitt.....	9 1/2—10 1/4
Solder joints.....	14—14 1/2
Siphon tops.....	42
Small foundry type.....	10 1/4—10 3/4
Monotype.....	10 1/4—10 3/4
Lino. and stereotype.....	9 1/4—9 3/4
Electrotype.....	6—6 1/2
Hand picked type shells.....	6—6 1/2
Lino. and stereo. dross.....	2 3/4—3 1/4
Electro dross.....	2 3/4—3 1/4

(Effective Nov. 9, 1959)



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## IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL  
PRICESBILLETS, BLOOMS,  
SLABSPIL-  
INGSHAPES  
STRUCTURALS

## STRIP

	Carbon Re-rolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide- Flange	Hot- rolled	Cold- rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot- rolled	Alloy Cold- rolled
EAST	Bethlehem, Pa.		\$119.00 B3		5.55 B3	8.10 B3	5.55 B5						
	Buffalo, N. Y.	\$80.00 R3, B3	\$99.50 R3, B3	\$119.00 R3, B3	6.50 B3	5.55 B3	8.10 B3	5.55 B3	5.10 B3, R3	7.425 S16, R7	7.575 B3		
	Phila., Pa.								7.875 P15				
	Harrison, N. J.												15.55 C11
	Conschocken, Pa.		\$104.50 A2	\$126.00 A2				5.15 A2		7.575 A2			
	New Bedford, Mass.								7.875 R6				
	Johnstown, Pa.	\$80.00 B3	\$99.50 B3	\$119.00 B3		5.55 B3	8.10 B3						
	Boston, Mass.								7.975 T8				
	New Haven, Conn.								7.875 D1				
	Baltimore, Md.								7.425 T8				15.90 T8
	Phoenixville, Pa.				5.55 P2		5.55 P2						
	Sparrows Pt., Md.							5.10 B3		7.575 B3			
MIDDLE WEST	New Britain, Bridgeport, Wallingford, Conn.		\$119.00 N8						7.875 W1, S7				
	Pawtucket, R. I. Worcester, Mass.								7.975 N7, A5				15.90 N7 15.70 T8
	Alton, Ill.							5.30 L1					
	Ashland, Ky.							5.10 A7		7.575 A7			
	Canton-Massillon, Dover, Ohio		\$102.00 R3	\$119.00 R3, \$114.00 T5					7.425 G4		10.80 G4		
	Chicago, Franklin Park, Evanston, Ill.	\$80.00 U1, R3	\$99.50 U1, R3, W8	\$119.00 U1, R3, W8	6.50 U1	5.50 U1, W8, P13	8.05 U1, Y1, W8	5.50 U1	5.10 W8, N4, A1	7.525 A1, T8, M8	7.575 W8	8.40 W8, S9, J3	15.55 A1, S9, G4, T8
	Cleveland, Ohio								7.425 A5, J3		10.75 A5	8.40 J3	
	Detroit, Mich.			\$119.00 R5				5.10 G3, M2	7.425 M2, S1, D1, P11	7.575 G3	10.80 S1		
	Anderson, Ind.								7.425 G4				
	Gary, Ind. Harbor, Indiana	\$80.00 U1	\$99.50 U1	\$119.00 U1, Y1		5.50 U1, J3	8.05 U1, J3	5.50 J3	5.10 U1, J3, Y1	7.425 Y1	7.575 U1, J3, Y1	10.90 Y1	8.40 U1, Y1
	Stirling, Ill.	\$80.00 N4				5.50 N4	7.75 N4	5.50 N4	5.20 N4				
	Indianapolis, Ind.								7.575 R5				15.70 R5
WEST	Newport, Ky.							5.10 A9				8.40 A9	
	Niles, Warren, Ohio Sharon, Pa.		\$99.50 S1, C10	\$119.00 C10, S1				5.10 R3, S1	7.425 R3, T4, S1	7.575 R3, S1	10.80 R3, S1	8.40 S1	15.55 S1
	Owensboro, Ky.	\$80.00 G5	\$99.50 G5	\$119.00 G5									
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	\$80.00 U1, P6	\$99.50 U1, C11, P6	\$119.00 U1, C11, B7	6.50 U1	5.50 U1, J3	8.05 U1, J3	5.50 U1	5.10 P6	7.425 J3, B4 7.525 E3		8.40 S9	15.55 S9
	Weirton, Wheeling, Follansbee, W. Va.				6.50 U1, W3	5.50 W3		5.50 W3	5.10 W3	7.425 W5	7.575 W3	10.80 W3	
	Youngstown, Ohio	\$80.00 R3	\$99.50 Y1, C10	\$119.00 Y1			8.05 Y1		5.10 U	7.425 Y1, R5	7.575 U1, Y1	10.95 Y1	8.40 U1, Y1
	Fontana, Cal.	\$90.50 K1	\$109.00 K1	\$140.00 K1		6.30 K1	8.85 K1	6.45 K1	5.825 K1	9.20 K1			
	Geneva, Utah		\$99.50 C7			5.50 C7	8.05 C7						
	Kansas City, Mo.					5.60 S2	8.15 S2					8.45 S2	
	Los Angeles, Torrance, Cal.		\$109.00 B2	\$130.00 B2		6.20 C7, B2	8.75 B2		5.85 C7, B2	9.30 C1, R5		9.60 B2	17.75 J3
	Minneapolis, Colo.					5.80 C6			6.20 C6	9.375 C6			
	Portland, Ore.					6.25 O2							
SOUTH	San Francisco, Niles, Pittsburg, Cal.		\$109.00 B2			6.15 B2	8.70 B2		5.85 C7, B2				
	Seattle, Wash.		\$109.00 B2			6.25 B2	8.90 B2		6.10 B2				
	Atlanta, Ga.					5.70 A8			5.10 A8				
	Fairfield, Ala. City, Birmingham, Ala.	\$80.00 T2	\$99.50 T2			5.50 T2 R3, C16	8.05 T2			7.575 T2			
	Houston, Lone Star, Texas		\$104.50 S2	\$124.00 S2		5.00 S2	8.15 S2					8.45 S2	

(Effective Nov. 9, 1959)

## IRON AGE

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

STEEL  
PRICES

	SHEETS								WIRE ROD	TINPLATE†		Holloware Enameling 29 ga.
	Hot-rolled 18 ga. & hvyr.	Cold- rolled	Galvanized (Hot-dipped)	Enamel- ing	Long Terné	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.	Hi Str. Low Alloy Galv.		Cokes* 7.25-lb. base box	Electro** 0.25-lb. base box	
EAST	Buffalo, N. Y.	5.10 B3	6.275 B3			7.525 B3	9.275 B3		6.40 W6	† Special coated mfg. terms deduct 35¢ from 1.25-lb. coke base box price, 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct \$2.20 from 1.25 lb. coke base box. * COKES: 1.50-lb. add 25¢. **ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add \$1.00. Differential 1.00 lb./0.25 lb. add 65¢.		
	Claymont, Del.											
	Coatesville, Pa.											
	Conshohocken, Pa.	5.15 A2	6.325 A2			7.575 A2						
	Harrisburg, Pa.											
	Hartford, Conn.											
	Johnstown, Pa.								6.40 B3			
	Fairless, Pa.	5.15 U1	6.325 U1			7.575 U1	9.325 U1			\$10.50 U1	\$9.20 U1	
	New Haven, Conn.											
	Phoenixville, Pa.											
MIDDLE WEST	Sparrows Pt., Md.	5.10 B3	6.275 B3	6.875 B3		7.525 B3	9.275 B3	10.025 B3	6.50 B3	\$10.40 B3	\$9.10 B3	
	Worcester, Mass.								6.70 A5			
	Trenton, N. J.											
	Alton, Ill.								6.60 L1			
	Ashland, Ky.	5.10 A7		6.875 A7	6.775 A7	7.525 A7						
	Canton-Massillon, Ohio			6.875 R1, R3								
	Chicago, Joliet, Ill.	5.10 W8, A1				7.525 U1, W8			6.40 A5, R3, W8			
	Sterling, Ill.								6.50 N4, K2			
	Cleveland, Ohio	5.10 R3, J3	6.275 R3, J3	7.65 R3*	6.775 R3	7.525 R3, J3	9.275 R3, J3		6.40 A5			
	Detroit, Mich.	5.10 G3, M2	6.275 G3, M2			7.525 G3	9.275 G3					
WEST	Newport, Ky.	5.10 A9	6.275 A9									
	Gary, Ind. Harbor, Indiana	5.10 U1, I3, Y1	6.275 U1, I3, Y1	6.875 U1, I3	6.775 U1, I3, Y1	7.225 U1	7.525 U1, Y1, I3	9.275 U1, Y1	6.40 Y1	\$10.40 U1, Y1	\$9.10 I3, U1, Y1	7.85 U1, Y1
	Granite City, Ill.	5.20 G2	6.375 G2	6.975 G2							\$9.20 G2	7.95 G2
	Kokomo, Ind.			6.975 C9					6.50 C9			
	Mansfield, Ohio	5.10 E2	6.275 E2		7.225 E2							
	Middletown, Ohio		6.275 A7	6.875 A7	6.775 A7	7.225 A7						
	Niles, Warren, Ohio Sharon, Pa.	5.10 R3, S1	6.275 R3	6.875 R3 7.65 R3*	6.775 S1	7.225 S1*, R3	7.525 R3, S1	9.275 R3			\$9.10 R3	
	Pittsburgh, Midland, Butler, Donora, Aliquippa, McKeesport, Pa.	5.10 U1, J3, P6	6.275 U1, J3, P6	6.875 U1, J3 7.50 E3*	6.775 U1	7.525 U1, J3	9.275 U1, J3	10.025 U1, J3	6.40 A5, J3, P6	\$10.40 U1, J3	\$9.10 U1, J3	7.85 U1, J3
	Portsmouth, Ohio	5.10 P7	6.275 P7						6.40 P7			
	Wairton, Wheeling, Follansbee, W. Va.	5.10 W3, W5	6.275 W3, F3, W5	6.875 W3, W5 7.50 W3*	7.225 W3, W5	7.525 W3	9.275 W3			\$10.40 W5, W3	\$9.10 W5, W3	7.85 W5
SOUTH	Youngstown, Ohio	5.10 U1, Y1	6.275 Y1	7.50 J3*	6.775 Y1	7.525 Y1	9.275 Y1		6.40 Y1			
	Fontana, Cal.	5.825 K1	7.40 K1			8.25 K1	10.40 K1			\$11.05 K1	\$9.75 K1	
	Geneva, Utah	5.20 C7										
	Kansas City, Mo.								6.65 S2			
	Los Angeles, Torrance, Cal.								7.20 B2			
	Minnequa, Colo.								6.65 C6			
	San Francisco, Niles, Pittsburg, Cal.	5.80 C7	7.225 C7	7.625 C7					7.20 C7	\$11.05 C7	\$9.75 C7	
	Atlanta, Ga.											
	Fairfield, Ala. Alabama City, Ala.	5.10 T2, R3	6.275 T2, R3	6.875 T2, R3	6.775 T2				6.40 T2, R3	\$10.50 T2	\$9.20 T2	
	Houston, Texas								6.65 S2			

\* Electrogalvanized sheets.

(Effective Nov. 9, 1959)

\*7.425 at Sharon-Niles is 7.225

STEEL  
PRICES

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforc- ing	Cold Finished	Alloy Hot- rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	
EAST	Bethlehem, Pa.				6.725 B3	9.025 B3	8.30 B3					
	Buffalo, N. Y.	5.675 R3,B3	5.675 R3,B3	7.70 B5	6.725 B3,R3	9.025 B3,B5	8.30 B3	5.30 B3				8.00 W6
	Claymont, Del.							5.30 C4		7.90 C4	7.95 C4	
	Coatesville, Pa.							5.30 L4		7.90 L4	7.95 L4	
	Conshohocken, Pa.							5.30 A2	6.375 A2	7.90 A2	7.95 A2	
	Harrisburg, Pa.							5.30 P2	6.375 P2			
	Milton, Pa.	5.825 M7	5.825 M7									
	Hartford, Conn.			8.15 R3		9.325 R3						
	Johnstown, Pa.	5.675 B3	5.675 B3		6.725 B3		8.30 B3	5.30 B3		7.90 B3	7.95 B3	8.00 B3
	Fairless, Pa.	5.825 U1	5.825 U1		6.875 U1							
	Newark, Camden, N. J.			8.10 W10, P10		9.20 W10, P10						
	Bridgeport, Putnam, Williamantic, Conn.			8.20 W10 8.15 J3	6.80 N8	9.175 N8						
	Sparrows Pt., Md.		5.675 B3					5.30 B3		7.90 B3	7.95 B3	8.10 B3
	Palmer, Worcester, Roadville, Mansfield, Mass.			8.20 B5, C14		9.325 A5,B5						8.30 A5, W6
	Spring City, Pa.			8.10 K4		9.20 K4						
MIDDLE WEST	Alton, Ill.	5.875 L1										8.20 L1
	Ashland, Newport, Ky.							5.30 A7,A9		7.90 A9	7.95 A7	
	Canton, Massillon, Mansfield, Ohio	6.15* R3		7.65 R3,R2	6.725 R3 6.475 T5	9.025 R3,R2 8.775 T5		5.30 E2				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 U1,R3, W8,N4,P13	5.675 U1,R3, N4,P13,W8 5.875 L1	7.65 A5, W10,W8, B5,L2,N9	6.725 U1,R3, W8	9.025 A5, W10,W8, L2,N8,B5	8.30 U1,W8, R3	5.30 U1,A1, W8,I3	6.375 U1	7.90 U1, W8	7.95 U1, W8	8.00 A5,R3, W8,N4, K2,W7
	Cleveland, Elyria, Ohio	5.675 R3	5.675 R3	7.65 A5,C13, C18		9.025 A5, C13,C18	8.30 R3	5.30 R3,J3	6.375 J3		7.95 R3,J3	8.00 A5, C13,C18
	Detroit, Mich.	5.675 G3	5.675 G3	7.90 P3 7.85 P8,B5 7.65 R5	6.725 R5,G3	9.025 R5 9.225 B5,P3, P8	8.30 G3	5.30 G3		7.90 G3	7.95 G3	
	Duluth, Minn.											8.00 A5
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 U1,I3, Y1	5.675 U1,I3, Y1	7.65 R3,J3	6.725 U1,I3, Y1	9.025 R3,M4	8.30 U1,Y1	5.30 U1,I3, Y1	6.375 J3, I1	7.90 U1, Y1	7.95 U1, Y1,I3	8.10 M4
	Granite City, Ill.							5.40 G2				
	Kokomo, Ind.		5.775 C9									8.10 C9
	Sterling, Ill.	5.775 N4	5.775 N4					5.30 N4				8.10 K2
	Niles, Warren, Ohio Sharon, Pa.			7.65 C10	6.725 C10	9.025 C10		5.30 R3,S1		7.90 S1	7.95 R3, S1	
	Owensboro, Ky.	5.675 G5			6.725 G5							
	Pittsburgh, Midland, Donera, Aliquippa, Pa.	5.675 U1,J3	5.675 U1,J3	7.65 A5,B4, R3,J3,C11, W10,S9,C8, M9	6.725 U1,J3, C11,B7	9.025 A5, W10,R3,S9, C11,C8,M9	8.30 U1,J3	5.30 U1,J3	6.375 U1,J3	7.90 U1, J3,B7	7.95 U1, J3,B7	8.00 A5, J3,P6
	Portsmouth, Ohio											8.00 P7
WEST	Weirton, Wheeling, Follansbee, W. Va.							5.30 W5				
	Youngstown, Ohio	5.675 U1,R3, Y1	5.675 U1,R3, Y1	7.65 A1,Y1, F2	6.725 U1,Y1	9.025 Y1,F2	8.30 U1,Y1	5.30 U1, R3,Y1		7.90 Y1	7.95 U1,Y1	8.00 Y1
	Emeryville, Fontana, Cal.	6.425 J5 6.375 K1	6.425 J5 6.375 K1		7.775 K1		9.00 K1	6.10 K1		8.30 K1	8.75 K1	
	Geneva, Utah							5.30 C7			7.95 C7	
	Kansas City, Mo.	5.925 S2	5.925 S2		6.975 S2		8.55 S2					8.25 S2
	Los Angeles, Torrance, Cal.	6.375 C7,B2	6.375 C7,B2	9.10 R3,P14, S12	7.775 B2	11.00 P14, S12	9.00 B2					8.95 B2
	Minnequa, Colo.	6.125 C6	6.125 C6					6.15 C6				8.25 C6
	Portland, Ore.	6.425 O2	6.425 O2									
	San Francisco, Niles, Pittsburg, Cal.	6.375 C7 6.425 B2	6.375 C7 6.425 B2				9.05 B2					8.95 C7,C6
	Seattle, Wash.	6.425 B2,N6, A10	6.425 B2,A10				9.05 B2	6.20 B2		8.40 B2	8.85 B2	
SOUTH	Atlanta, Ga.	5.875 A8	5.675 A8									8.00 A8
	Fairfield City, Ala. Birmingham, Ala.	5.675 T2,R3, C16	5.675 T2,R3, C16	8.25 C16			8.30 T2	5.30 T2,R3			7.95 T2	8.00 T2,R3
	Houston, Ft. Worth, Lone Star, Texas	5.925 S2	5.925 S2		6.975 S2		8.55 S2	5.40 S2		7.60 S2	8.05 S2	8.25 S2

† Merchant Quality—Special Quality 35¢ higher.

(Effective Nov. 9, 1959)

\* Special Quality.

# STEEL PRICES

## Key to Steel Producers

### With Principal Offices

A1 Acme Steel Co., Chicago  
A2 Alan Wood Steel Co., Conahocken, Pa.  
A3 Allegheny Ludlum Steel Corp., Pittsburgh  
A4 American Cladmetals Co., Carnegie, Pa.  
A5 American Steel & Wire Div., Cleveland  
A6 Angel Nail & Chaplet Co., Cleveland  
A7 Armo Steel Corp., Middletown, Ohio  
A8 Atlantic Steel Co., Atlanta, Ga.  
A9 Acme-Newport Steel Co., Newport, Ky.  
A10 Alaska Steel Mills, Inc., Seattle, Wash.  
B1 Babcock & Wilcox Tube Div., Beaver Falls, Pa.  
B2 Bethlehem Steel Co., Pacific Coast Div.  
B3 Bethlehem Steel Co., Bethlehem, Pa.  
B4 Blair Strip Steel Co., New Castle, Pa.  
B5 Bliss & Laughlin, Inc., Harvey, Ill.  
B6 Brook Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.  
B7 A. M. Byers, Pittsburgh  
B8 Braeburn Alloy Steel Corp., Braeburn, Pa.  
C1 Calstrip Steel Corp., Los Angeles  
C2 Carpenter Steel Co., Reading, Pa.  
C4 Claymont Products Dept., Claymont, Del.  
C6 Colorado Fuel & Iron Corp., Denver  
C7 Columbia Geneva Steel Div., San Francisco  
C8 Columbia Steel & Shifting Co., Pittsburgh  
C9 Continental Steel Corp., Kokomo, Ind.  
C10 Copperweld Steel Co., Pittsburgh, Pa.  
C11 Crucible Steel Co. of America, Pittsburgh  
C13 Cuyahoga Steel & Wire Co., Cleveland  
C14 Compressed Steel Shifting Co., Readville, Mass.  
C15 G. O. Carlson, Inc., Thorndale, Pa.  
C16 Connors Steel Div., Birmingham  
C18 Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.  
D1 Detroit Steel Corp., Detroit  
D2 Driver, Wilbur B. Co., Newark, N. J.  
D3 Driver Harris Co., Harrison, N. J.  
D4 Dickson Weatherproof Nail Co., Evanston, Ill.  
E1 Eastern Stainless Steel Corp., Baltimore  
E2 Empire-Reeves Steel Corp., Mansfield, O.  
E3 Enamel Products & Plating Co., McKeesport, Pa.  
F1 Firth Sterling, Inc., McKeesport, Pa.  
F2 Fitzsimons Steel Corp., Youngstown  
F3 Follansbee Steel Corp., Follansbee, W. Va.

G2 Granite City Steel Co., Granite City, Ill.  
G3 Great Lakes Steel Corp., Detroit  
G4 Greer Steel Co., Dover, O.  
G5 Green River Steel Corp., Owenboro, Ky.  
H1 Hanna Furnace Corp., Detroit  
I2 Ingersoll Steel Div., New Castle, Ind.  
I3 Inland Steel Co., Chicago, Ill.  
I4 Interlake Iron Corp., Cleveland  
J1 Jackson Iron & Steel Co., Jackson, O.  
J2 Jessop Steel Corp., Washington, Pa.  
J3 Jones & Laughlin Steel Corp., Pittsburgh  
J4 Joslyn Mfg. & Supply Co., Chicago  
J5 Judson Steel Corp., Emeryville, Calif.  
K1 Kaiser Steel Corp., Fontana, Calif.  
K2 Keystone Steel & Wire Co., Peoria  
K4 Keystone Drawn Steel Co., Spring City, Pa.  
L1 Laclede Steel Co., St. Louis  
L2 La Salle Steel Co., Chicago  
L3 Lone Star Steel Co., Dallas  
L4 Lukens Steel Co., Coatesville, Pa.  
M1 Mahoning Valley Steel Co., Niles, O.  
M2 McLouth Steel Corp., Detroit  
M3 Mercer Tube & Mfg. Co., Sharon, Pa.  
M4 Mid States Steel & Wire Co., Crawfordsville, Ind.  
M6 Mystic Iron Works, Everett, Mass.  
M7 Milton Steel Products Div., Milton, Pa.  
M8 Mill Strip Products Co., Chicago, Ill.  
M9 Moltrup Steel Products Co., Beaver Falls, Pa.  
N1 National Supply Co., Pittsburgh  
N2 National Tube Div., Pittsburgh  
N4 Northwestern Steel & Wire Co., Sterling, Ill.  
N6 Northwest Steel Rolling Mills, Seattle  
N7 Newman Crosby Steel Co., Pawtucket, R. I.  
N8 Carpenter Steel of New England, Inc., Bridgeport, Conn.  
N9 Nelson Steel & Wire Co.  
O1 Oliver Iron & Steel Co., Pittsburgh  
O2 Oregon Steel Mills, Portland  
P1 Page Steel & Wire Div., Monessen, Pa.  
P2 Phoenix Steel Corp., Phoenixville, Pa.  
P3 Pilgrim Drawn Steel Div., Plymouth, Mich.  
P4 Pittsburgh Coke & Chemical Co., Pittsburgh  
P6 Pittsburgh Steel Co., Pittsburgh  
P7 Portsmouth Div., Detroit Steel Corp., Detroit  
P8 Plymouth Steel Co., Detroit  
P9 Pacific States Steel Co., Niles, Cal.  
P10 Precision Drawn Steel Co., Camden, N. J.

P11 Production Steel Strip Corp., Detroit  
P13 Phoenix Mfg. Co., Joliet, Ill.  
P14 Pacific Tube Co.  
P15 Philadelphia Steel and Wire Corp.  
R1 Reeves Steel & Mfg. Div., Dover, O.  
R2 Reliance Div., Eaton Mfg. Co., Mansfield, O.  
R3 Republic Steel Corp., Cleveland  
R4 Rosbling Sons Co., John A., Trenton, N. J.  
R5 Jones & Laughlin Steel Corp., Stainless and Strip Div.  
R6 Rodney Metals, Inc., New Bedford, Mass.  
R7 Rome Strip Steel Co., Rome, N. Y.  
S1 Sharon Steel Corp., Sharon, Pa.  
S2 Sheffield Steel Div., Kansas City  
S3 Shenango Furnace Co., Pittsburgh  
S4 Simonds Saw and Steel Co., Fitchburg, Mass.  
S5 Sweet's Steel Co., Williamsport, Pa.  
S7 Stanley Works, New Britain, Conn.  
S8 Superior Drawn Steel Co., Monaca, Pa.  
S9 Superior Steel Div. of Copperweld Steel Co., Carnegie, Pa.  
S10 Seneca Steel Service, Buffalo  
S11 Southern Electric Steel Co., Birmingham  
S12 Sierra Drawn Steel Corp., Los Angeles, Calif.  
S13 Seymour Mfg. Co., Seymour, Conn.  
S14 Screw and Bolt Corp. of America, Pittsburgh, Pa.  
T1 Tonawanda Iron Div., N. Tonawanda, N. Y.  
T2 Tennessee Coal & Iron Div., Fairfield  
T3 Tennessee Products & Chem. Corp., Nashville  
T4 Thomas Strip Div., Warren, O.  
T5 Timken Steel & Tube Div., Canton, O.  
T7 Texas Steel Co., Fort Worth  
T8 Thompson Wire Co., Boston  
U1 United States Steel Corp., Pittsburgh  
U2 Universal Cyclops Steel Corp., Bridgeville, Pa.  
U3 Ulbrich Stainless Steels, Wallingford, Conn.  
U4 U. S. Pipe & Foundry Co., Birmingham  
W1 Wallingford Steel Co., Wallingford, Conn.  
W2 Washington Steel Corp., Washington, Pa.  
W3 Weirton Steel Co., Weirton, W. Va.  
W4 Wheatland Tube Co., Wheatland, Pa.  
W5 Wheeling Steel Corp., Wheeling, W. Va.  
W6 Wickwire Spencer Steel Div., Buffalo  
W7 Wilson Steel & Wire Co., Chicago  
W8 Wisconsin Steel Div., S. Chicago, Ill.  
W9 Woodward Iron Co., Woodward, Ala.  
W10 Wyckoff Steel Co., Pittsburgh  
W12 Wallace Barnes Steel Div., Bristol, Conn.  
Y1 Youngstown Sheet & Tube Co., Youngstown, O.

## PIPE AND TUBING

Base discounts (per) L.S. mills. Base price about \$200 per net ton.

	BUTTWELD												SEAMLESS											
	1/2 in.		3/4 in.		1 in.		1 1/4 in.		1 1/2 in.		2 in.		2 1/2-3 in.		2 in.		2 1/2 in.		3 in.		3 1/2-4 in.			
	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.	Bk.	Gal.
<b>STANDARD T. &amp; C.</b>																								
Sparrows Pt. B3.....	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50										
Youngstown R3.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50										
Fontana K1.....	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50										
Pittsburgh J3.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50		
Alton, Ill. L1.....	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50										
Sharon M3.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50										
Fairless N2.....	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50										
Pittsburgh N1.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50		
Wheeling W5.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50										
Westland W4.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50										
Youngstown Y1.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50		
Indiana Harbor Y1.....	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50										
Lorain N2.....	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50		
<b>EXTRA STRONG PLAIN ENDS</b>																								
Sparrows Pt. B3.....	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50										
Youngstown R3.....	4.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50										
Fairless N2.....	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50										
Fontana K1.....	*6.25	*22.25					1.25		1.75		2.25		2.75											
Pittsburgh J3.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50		
Alton, Ill. L1.....	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50										
Sharon M3.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50										
Pittsburgh N1.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50		
Wheeling W5.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50										
Westland W4.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50										
Youngstown Y1.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50		
Indiana Harbor Y1.....	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50										
Lorain N2.....	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50		

Threads only, butt weld and seamless, 2 1/2 pt. higher discount. Plain ends, butt weld and seamless, 3-in. and under, 5 1/2 pt. higher discount.  
Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: 1/2, 3/4 and 1-in., 2 pt.; 1 1/4, 1 1/2 and 2-in., 1 1/2 pt.; 2 1/2 and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2 1/2 and 3-in. pipe by 2 points; zinc price in range over 1¢ to 9¢ would increase discounts.  
East St. Louis zinc price now 12.50¢ per lb.

(Effective Nov. 9, 1959)

## TOOL STEEL

F.o.b. mill	W	Cr	V	Mo	Co	per lb	SAE
18	4	1	—	—	—	\$1.84	T-1
18	4	1	—	—	5	2.545	T-4
18	4	2	—	—	—	2.005	T-2
1.5	4	1.5	8	—	—	1.20	M-1
6	4	2	—	—	—	1.59	M-3
6	4	2	5	—	—	1.345	M-2
High-carbon chromium...						.955	D-3, D-5
Oil hardened manganese						.505	O-2
Special carbon						.38	W-1
Extra carbon						.38	W-1
Regular carbon						.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

## CLAD STEEL

Base prices, cents per lb f.o.b.

Cladding	Plate (L4, C4, A3, J2)			Sheet (J2)
	10 pct	15 pct	20 pct	
302				37.50
304	28.80	31.55	34.30	40.00
316	42.20	46.25	50.25	58.75
321	34.50	37.75	41.05	47.25
347	40.00	44.65	48.55	57.00
405	24.60	26.90	29.25	
410	22.70	24.85	27.00	
430	23.45	25.65	27.90	

CR Strip (S9) Copper, 10 pct, 2 sides, 42.50; 1 side, 35.85.

## RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rail	Light Rail	Joint Bars	Track Spikes	Tie Plates	Track Bolts Unthreaded
Bessemer U1	5.75	6.725	7.25			15.35
Cleveland R3						
So. Chicago R3						10.10
Ensley T2	5.75	6.725				6.875
Fairfield T2		6.725				10.10
Gary U1	5.75					6.875
Huntington C16		6.725				
Ind. Harbor U1						10.10
Johnstown B3		6.725				
Joliet U1			7.25			
Kansas City S2				10.10		15.35
Lackawanna B3	5.75	6.725	7.25			6.875
Lebanon B3			7.25			15.35
Minneapolis C6	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh S14						15.35
Seattle B3				10.10		
Steelton B3	5.75		7.25		6.75	15.85
Struthers Y1					10.10	
Torrance C7						6.75
Williamsport S3		6.725				
Youngstown R5					10.10	

## COKE

Furnace, beehive (f.o.b.)	Net-Ton
Connellsville, Pa.	\$14.50 to \$15.50
Foundry, beehive (f.o.b.)	\$18.50
Foundry oven coke	
Buffalo, del'd	\$33.25
Detroit f.o.b.	32.00
New England, del'd	33.55
New Haven, f.o.b.	31.00
Kearney, N. J., f.o.b.	31.00
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	34.35
Erie, Pa., f.o.b.	32.00
Cleveland, del'd	34.19
Cincinnati, del'd	32.84
St. Paul, f.o.b.	31.25
St. Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

## LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1959 season. Freight changes for seller's account.	Gross Ton
Openhearth lump	\$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

## ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi-Processed	Fully Processed
Field		9.875	
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor		12.475	
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. T2	15.70	15.20	15.70
Trans. 65	16.30		
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (J3); Beech Bottom (W5); Brackenridge (A3); Granite City (G2); Indiana Harbor (J3); Mansfield (E2); Newport, Ky. (A9); Niles, O. (S1); Vandergrift (U1); Warren, O. (R3); Zanesville, Butler (A7).

## ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (in.)	Length (in.)	Price	Diam. (in.)	Length (in.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2 1/2	30	41.50			
2	24	64.00			

\* Prices shown cover carbon nipples.

## REFRACTORIES

## Fire Clay Brick

Super duty, Mo., Pa., Md., Ky.	\$185.00
High duty (except Salina, Pa., add \$5.00)	140.00
Medium duty	125.00
Low duty (except Salina, Pa., add \$2.00)	103.00
Ground fire clay, net ton, bulk	22.50

## Silica Brick

Mt. Union, Pa., Ensley, Ala.	\$158.00
Childs, Hays, Latrobe, Pa.	163.00
Chicago District	168.00
Western Utah	183.00
California	165.00

## Super Duty

Hays, Pa., Athens, Tex., Windham, Warren, O., Morrisville	163.00-168.00
Silica cement, net ton, bulk, Latrobe	29.75
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

## Chrome Brick

Standard chemically bonded, Balt.	\$109.00
Standard chemically bonded, Curt-ner, Calif.	119.00
Burned, Balt.	103.00

## Magnesite Brick

Standard, Baltimore	\$140.00
Chemically bonded, Baltimore	119.00

## Grain Magnesite

Domestic, f.o.b. Baltimore in bulk	\$73.00
Domestic, f.o.b. Chewah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

## Dead Burned Dolomite

F.o.b. bulk, producing points in: Pa., W. Va., Ohio	\$16.75
Missouri Valley	15.60
Midwest	17.00

(Effective Nov. 9, 1959)

## MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard Q Coated Nails		Wire Fence		Single Loop Bale Ties		Galv. Barbed and Twisted Barbed Wire		Merch. Wire Ann'd		Merch. Wire Galv.	
	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col	Col
Alabama City R3	187	187	212	193	9.00	9.55						
Aliquippa J3***	173	190	212	190	9.00	9.675						
Atlanta A8**	175	192	214	198	8.75	9.425						
Bartonville K2**	175	192	214	198	9.10	9.775						
Buffalo W6					9.00	9.55*						
Chicago N4**	177	190	212	196	9.00	9.70						
Chicago R3					9.00	9.55						
Cleveland A6												
Cleveland A5												
Crawford M4**	175	192	214	198	9.10	9.775						
Donora, Pa. A5	173	187	212	193	9.00	9.55						
Duluth A5	173	187	212	193	9.00	9.55						
Fairfield, Ala. T2	173	187	212	193	9.00	9.55						
Galveston D4	9.10											
Houston S2	173	192	217	198	9.25	9.80						
Jacksonville M4	184-1	197	219	203	9.10	9.775						
Johnstown B3**	173	190	217	196	9.00	9.675						
Joliet, Ill. A5	172	187	212	193	9.00	9.55						
Kokomo C9	175	180	214	195*	9.10	9.65*						
L. Angeles B2**					9.95	10.625						
Kansas City S2*	178	192	217	198*	9.25	9.80*						
Minneapolis C6	178	192	217	198*	9.25	9.80*						
Monessen P6					9.65	10.325						
Palmer, Mass. W6					9.30	9.85*						
Pittsburg, Cal. C7	195	210	213		9.60	10.15						
Rushin, Pa. A5	173	187	212	193	9.00	9.55						
So. Chicago R3	173	187	212	193	8.65	9.20						
S. San Fran. C6			236		9.95	10.50						
Sparrows Pt. B3**	175		214	196	9.10	9.775						
Struthers, O. Y1*					8.65	9.20						
Worcester A5	179				9.30	9.85						
Williamsport S3												

\* Zinc less than .10¢. \*\*\* 10¢ zinc.  
\*\* 11-12¢ zinc. † Plus zinc extras.  
‡ Wholesalers only.

## C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT				
	0.26-0.40	0.41-0.60	0.61-0.80	0.81-1.05	1.06-1.35
Anderson, Ind. C4	8.95	10.40	12.60	15.60	18.55
Baltimore, Md. T2	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. W12		10.70	12.90	16.10	19.30
Boston T8	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. R7	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. S9	8.95	10.40	12.60	15.60	18.55
Chicago				15.60	
Cleveland A5	8.95	10.40	12.60	15.60	18.55
Darbhong S1	9.05	10.50	12.70		
Detroit D1	9.05	10.50	12.70	15.70	
Detroit D2	9.05	10.50	12.70		
Doer, O. G4	8.95	10.40	12.60	15.60	18.55
Evansville, Ill. M8	9.05	10.40	12.60		
Franklin Park, Ill. T8	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. C11			12.90	16.10	19.30
Indianapolis R5	9.10	10.55	12.60	15.60	18.55
Los Angeles C1	11.15	12.60	14.80	17.80	
New Britain, Conn. S7	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. B4	8.95	10.40	12.60	15.60	
New Haven, Conn. D1	9.40	10.70	12.90	15.90	
Pawtucket, R. I. N7	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. A1	9.05	10.40	12.60	15.60	18.55
Sharon, Pa. S1	8.95	10.40	12.60	15.60	18.55
Trouton, R4	10.70	12.90	15.90	18.10	19.30
Wallingford W1	9.40	10.70	12.90	15.90	18.85
Warren, Ohio T4	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. A5	9.50	10.70	12.90	15.90	18.85
Youngstown R5	9.10	10.55	12.60	15.60	18.55

## BOILER TUBES

5 per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld	
	OD. in.	R.W. Gs.	H.R.	C.D.	H.R.	
Babcock & Wilcox...	2	13	40.28	47.21	35.74	
	2½	12	54.23	63.57	48.13	
	3	12	62.62	73.40	55.59	
	3½	11	73.11	85.70	65.84	
	4	10	97.08	113.00	88.10	
National Tube....	2	13	40.28	47.21	35.74	
	2½	12	54.23	63.57	48.13	
	3	12	62.62	73.40	55.59	
	3½	11	73.11	85.70	65.84	
	4	10	97.08	113.00	88.10	
Pittsburgh Steel...	2	13	40.28	47.21	.....	
	2½	12	54.23	63.57	.....	
	3	12	62.62	73.40	.....	
	3½	11	73.11	85.70	.....	
	4	10	97.08	113.00	.....	

## METAL POWDERS

Cents per lb, minimum truckload, delivered E. of Miss. River, unless otherwise noted.

### Iron Powders

#### Compacting Powders

Electrolytic, imported, f.o.b.	29.50 to 33.00
Electrolytic, domestic	34.50
Sponge	11.25
Atomized	11.25
Hydrogen Reduced	11.25 to 12.00
Carbonyl	88.00
Welding Powders*	8.10
Cutting and Scarfing Powders*	9.10

### Copper Powders

Electrolytic, domestic	47.25
Precipitated	40.50 to 45.00
Atomized	39.80 to 48.30
Hydrogen reduced, f.o.b.	43.25

Bronze	47.20 to 51.50
Chromium, electrolytic	\$5.00
Lead	19.00
Manganese, f.o.b.	42.00
Molybdenum	\$3.60 to \$3.95
Nickel	\$1.05 to \$1.03
Nickel Silver	53.50
Nickel Steel	13.00
Solder	13¢ plus metal value
Stainless Steel, 302	\$1.07
Stainless Steel, 316	\$1.26
Steel, atomized, prealloyed, 4600 series	14.00 plus metal value
Tin	14¢ plus metal value
Titanium, 99.25+%, per lb., f.o.b.	\$11.25
Tungsten	\$3.15 (nominal)

\* F.O.B., shipping point.

## BOLTS, NUTS, RIVETS, SCREWS

(Base discount, f.o.b. mill)

Pct. Discounts

Bolts	1-4 Containers	5 Containers	20,000 Lb.	40,000 Lb.
Machine				
1/2" and smaller x 3" and shorter	55	57	61	62
3/4" diam. x 3" and shorter	47	49 1/2	54	55
1/2" thru 1" diam x 6" and shorter	37	39 1/2	45	46
1/2" thru 1" diam, longer than 6" and 1 1/2" and larger x all lengths	31	34	40	41
Rolled thread, 1/2" and smaller x 3" and shorter	55	57	61	63
Carriage, lag, plow, tap, blank, step, elevator and fitting up bolts 1/2" and smaller x 6" and shorter	46	50 1/2	55	56

Note: Add 25 pct for less than container quantity. Distributor prices are 5 pct less on bolts and square nuts.

Nuts, Hex, HP reg. & hvy.	Full case or Keg price
3/4 in. or smaller	62
1/2 in. to 1 1/2 in. inclusive	56
1 1/2 in. and larger	51 1/2

C. P. Hex, reg. & hvy.	
3/4 in. or smaller	62
1/2 in. to 1 1/2 in. inclusive	56
1 1/2 in. and larger	51 1/2

Hot Galv. Hex Nuts (All Types)	
3/4 in. and smaller	41

Semi-finished Hex Nuts	
3/4 in. or smaller	62
1/2 in. to 1 1/2 in. inclusive	56
1 1/2 in. and larger	51 1/2

Finished	
3/4 in. and smaller	65

Rivets	Base per 100 lb
3/4 in. and larger	\$12.85
7/16 in. and smaller	15

Cap Screws	Discount (Packages)
New std. hex head, packaged	Full Finished H. C. Heat Treat
	Full Case

1/2" diam. and smaller x 6" and shorter	54	42
3/4", 1/2", and 1" diam. x 6" and shorter	38	33
1/2" diam. and smaller x longer than 6"	..	..
3/4", 1/2", and 1" diam. x longer than 6"	..	..

	C-1018 Steel Full-Finished Cartons Bulk	
1/4" through 3/4" dia. x 6" and shorter .....	59	48
3/4" through 1" dia. x 6" and shorter .....	45	32
Minimum quantity—1/4" through 3/4" diam., 15,000 pieces; 7/16" through 1/2" diam., 5,000 pieces; 3/4" through 1" diam., 2,000 pieces.		

### Machine Screws & Stove Bolts

	Discount	
	Mach. Screws	Stove Bolts
Plain Finish		
Cartons .....	60	60
Bulk		

To 1/4" diam. Incl.	Quantity	
25,000-and over	60	..
5/16 to 1/2" diam. Incl.	Quantity	
15,000-200,000	60	..

### Machine Screws & Stove Bolt Nuts

		Discount	
		Hex	Square
In Cartons .....	16	19	
	Quantity		

In Bulk	Quantity	
25,000-and over	15	16

## STEEL SERVICE CENTERS

Metropolitan Price, dollars per 100 lb.

Cities	City Delivery Charge	Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
		Hot-Rolled (18 ga. & over)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled	Standard Structural	Hot-Rolled (merchant)	Cold- Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed	
Atlanta		8.59	9.87	10.13	8.91	9.29	9.40	9.39	13.24				
Baltimore**	\$.10	9.90	10.10	10.09	11.55	10.00	10.65	10.15	11.90	17.48	16.48	21.58	20.83
Birmingham**		9.43	10.29	10.46	10.91	9.79	10.00	9.59	13.14	16.76			
Boston**	.10	10.52	11.27	11.82	12.17	10.42	10.72	10.34	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.80	10.50	11.35	11.30	10.25	10.40	9.90	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	8.69	10.35	11.10	10.35	8.62	9.16	8.79	10.80	17.10	16.10	19.70	20.45
Cincinnati**	.15	8.86	10.41	11.10	10.67	9.00	9.84	9.11	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	8.69 <sup>1</sup>	9.89	11.02	10.47	8.88	9.67	8.90	11.40	17.21	16.21	21.31	20.56
Denver	.20	9.60	11.84	12.94	9.63	9.96	10.04	10.00	11.19				20.84
Detroit**	.15	8.95	10.61	11.40	10.72	8.99	9.84	9.10	11.16	17.38	16.38	21.48	21.03
Houston**		9.65	9.65		10.85	9.65	9.35	8.90	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	9.02	10.27	11.37	9.33	9.71	9.82	9.81	10.22	16.87	15.87	20.37	19.62
Los Angeles**		9.95 <sup>1</sup>	11.55	12.20	11.55	10.00	10.00	9.10	14.20	18.30	16.45	21.30	20.80
Memphis	.15	8.55	9.80		8.60	8.93	9.01	8.97	12.11				
Milwaukee**	.15	8.83	10.49	11.24	10.49	8.76	9.30	8.93	11.04	17.24	15.34	21.24	19.09
New York	.10	9.27	10.59	11.40	9.74	9.87	9.84	10.09	13.35	16.16	15.60	20.10	19.35
Norfolk	.20	8.20			8.90	8.65	9.20	8.90	10.70				
Philadelphia	.10	8.30	9.35	10.71	9.35	9.25	9.20	9.50	12.05	16.58	15.58	20.08	19.33
Pittsburgh**	.15	8.69	9.84	10.91	10.45	8.62	9.78	8.79	11.40	17.10	16.10	19.70	20.45
Portland		10.00	11.75	13.30	11.95	11.50	11.10	9.85	15.30	18.50	17.45	20.75	20.25
San Francisco**	.10	11.00	11.95 <sup>2</sup>	11.50	12.25	11.00	10.95	10.75	15.20	18.30	16.35	22.90	20.60
Seattle**		11.55	12.30	12.50	12.65	11.00	10.20	11.10	16.20	18.60	17.80	22.70	22.20
Spokane**	.15	11.70	12.45	12.65	13.30	11.15	11.35	11.75	16.35	17.75	17.95	21.58	22.35
St. Louis**	.15	9.07	10.73	11.48	10.73	9.00	9.76	9.17	11.43	17.48	16.48	21.58	19.33
St. Paul**	.15	8.95	9.46	10.62	10.47	8.75	9.48	8.85	11.64		16.60		21.04

Base Quantities (Standard unless otherwise noted): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. \*\*These cities are on net pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—1/4" x 1"; Plate—1/4" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—1/2" x 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1/4" x 2 1/2"; cold drawn—15/16" to 2 1/2" round; Hot-rolled 4140—1/4" to 2 1/2" round; cold drawn—15/16" to 2 1/2" round.

† 10¢ zinc. ‡ Deduct for country delivery. 1 1/2 ga. & heavier; 2 1/4 ga. & lighter.

(Effective Nov. 9, 1959)

# PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. B6	68.00	68.50	69.00	69.50	
Birmingham R3	62.00	62.50*			
Birmingham W9	62.00	62.50*	66.50		
Birmingham U4	62.00	62.50*	66.50		
Buffalo R3	66.00	66.50	67.00	67.50	
Buffalo III	66.00	66.50	67.00	67.50	
Buffalo W6	66.00	66.50	67.00	67.50	
Chester P2	66.00	66.50	67.00	67.50	
Chicago 14	66.00	66.50	67.00	67.50	
Cleveland A5	66.00	66.50	67.00	67.00	71.00†
Cleveland R3	66.00	66.50	67.00	67.00	71.00†
Duluth 14	66.00	66.50	67.00	67.00	71.00†
Erie 14	66.00	66.50	67.00	67.00	71.00†
Everett M6	67.50	68.00	68.50		
Fontana K1	75.00	75.50			
Geneva, Utah C7	66.00	66.50			
Granite City G2	67.00	68.00	68.00		
Hubbard Y1			66.50		
Ironton, Utah C7	66.00	66.50			
Midland C11	66.00				
Minneapolis C6	68.00	68.50	69.00		
Monessen P6	66.00				
Neville 14	66.00	66.50	67.00	67.00	71.00†
N. Tonawanda T1	66.00	66.50	67.00	67.50	
Sharsville S3	66.00		66.50	67.00	
S. Chicago R3	66.00	66.50	67.00	67.00	
S. Chicago W8	66.00	66.50	67.00	67.00	
Svealand A2	68.00	68.50	69.00	69.50	
Toledo 14	66.00	66.50	67.00	67.00	
Troy, N. Y. R3	68.00	68.50	69.00	69.50	73.00
Youngstown Y1			66.50		

**DIFFERENTIALS:** Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, \$2 per ton for 0.50 to 0.75 pct nickel, \$1 for each additional 0.25 pct nickel. Add \$1.00 for 0.31-0.69 pct phos.

Silvery iron: Buffalo (6 pct), H1, \$79.25; Jackson J1, 14 (Globe Div.), \$78.00; Niagara Falls (15.01-15.50), \$101.00; Keokuk (14.01-14.50), \$103.50; (15.51-16.00), \$106.50. Add \$1.00 per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 18 pct. Add \$1.25 for each 0.50 pct manganese over 1.00 pct. Base for silvery pig iron (under .10 pct phos.); \$64.00. Add \$1.00 premium for all grades silvery to 18 pct.

† Intermediate low phos.

# STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingot, re-roll	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	28.00	31.50	29.00	32.75	33.25	34.50	51.25	41.50	48.25	—	22.25	—	22.50
Billets, forging	—	37.75	38.75	39.50	42.50	42.00	64.50	48.75	57.75	29.25	29.25	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	49.50	75.75	57.50	67.25	35.00	35.00	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	45.75	71.75	54.75	64.75	30.00	30.00	31.25	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	44.25	69.25	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	45.00	49.25	47.50	52.00	56.75	55.00	80.75	65.50	79.25	40.25	40.25	42.50	40.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	47.00	71.75	54.50	63.75	33.25	33.25	33.75	33.75

## STAINLESS STEEL PRODUCING POINTS:

**Sheets:** Midland, Pa., C11; Brackenridge, Pa., A3; Butler, Pa., A7; Vandergrift, Pa., U1; Washington, Pa., W2, J2; Baltimore, E1; Middletown, O., A7; Massillon, O., R3; Gary, U1; Bridgeville, Pa., U2; New Castle, Ind., J2; Detroit, M2; Louisville, O., R3.

**Strip:** Midland, Pa., C11; Waukegan, Cleveland, A5; Carnegie, Pa., S9; McKeesport, Pa., F1; Reading, Pa., C2; Washington, Pa., W2; W. Leeburg, Pa., A3; Bridgeville, Pa., U2; Detroit, M2; Detroit, S1; Canton, Massillon, O., R3; Harrison, N. J., D3; Youngstown, R5; Sharon, Pa., S1; Butler, Pa., A7; Wallingford, Conn., U3 (plus further conversion extras); W1 (2½¢ per lb. higher); Seymour, Conn., S13, (2½¢ per lb. higher); New Bedford, Mass., R6; Gary, U1, (2½¢ per lb. higher); Baltimore, Md., E1 (300 series only).

**Bar:** Baltimore, A7; S. Duquesne, Pa., U1; Munhall, Pa., U1; Reading, Pa., C2; Titusville, Pa., U2; Washington, Pa., J2; McKeesport, Pa., U1; Bridgeville, Pa., U2; Dunkirk, N. Y., A3; Massillon, O., R3; S. Chicago, U1; Syracuse, N. Y., C1; Watervliet, N. Y., A3; Waukegan, A5; Canton, O., T3, R3; Ft. Wayne, I4; Detroit, R3; Gary, U1; Owensboro, Ky., G3; Bridgeport, Conn., N8; Ambridge, Pa., B7.

**Wire:** Waukegan, A5; Massillon, O., R3; McKeesport, Pa., F1; Ft. Wayne, J4; Newark, N. J., D2; Harrison, N. J., D3; Baltimore, A7; Dunkirk, A3; Monessen, P1; Syracuse, C11; Bridgeville, U2; Detroit, R5; Reading, Pa., C2; Bridgeport, Conn., N8.

**Structurals:** Baltimore, A7; Massillon, O., R3; Chicago, Ill., J4; Watervliet, N. Y., A3; Syracuse, C11; S. Chicago, U1.

**Plates:** Ambridge, Pa., B7; Baltimore, E1; Brackenridge, Pa., A3; Chicago, U1; Munhall, Pa., U1; Midland, Pa., C11; New Castle, Ind., J2; Middletown, A7; Washington, Pa., J3; Cleveland, Massillon, R3; Coatesville, Pa., C15; Vandergrift, Pa., U1; Gary, U1.

**Forging billets:** Ambridge, Pa., B7; Midland, Pa., C11; Baltimore, A7; Washington, Pa., J2; McKeesport, F1; Massillon, Canton, O., R3; Watervliet, A3; Pittsburgh, Chicago, U1; Syracuse, C11; Detroit, R3; Munhall, Pa., S. Chicago, U1; Owensboro, Ky., G3; Bridgeport, Conn., N8; Reading, Pa., C2.

(Effective Nov. 9, 1959)



# RITCO FORGINGS

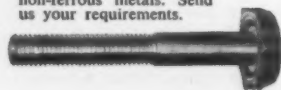
... best by any test!

**Toughness to shock** and stress is just one of the many features found in Ritco Forgings. While their dense, fibrous structure and controlled grain flow assure maximum impact resistance and fatigue strength, their smooth, highly accurate surfaces speed up assembly time, save hours of time and trouble. Made to close tolerance specifications, these finer forgings enable you to hold machining to a minimum . . . keep production costs down.

**Plan to write Ritco** into your product specifications the next time you need forgings. Made in a wide range of metals and alloys, and in many designs.

1834 \* 1959  
125<sup>th</sup>  
ANNIVERSARY

Ritco also offers complete machining facilities and makes Special Fasteners and Upsets of ferrous and non-ferrous metals. Send us your requirements.



Send us your blueprints now for estimates at no obligation!

## RHODE ISLAND TOOL COMPANY

Member Drop Forging Association

144 WEST RIVER STREET • PROVIDENCE 1, R. I.

# FERROALLOY PRICES

## Ferrochrome

Cents per lb contained Cr, lump, bulk, carloads, del'd. 67-71% Cr, 30-1.00% max. Si.			
0.02% C....	41.00	0.50% C....	38.00
0.05% C....	39.00	1.00% C....	37.75
0.10% C....	38.50	1.50% C....	37.50
0.20% C....	38.25	2.00% C....	37.25
4.00-4.50% C, 60-70% Cr, 1-2% Si....	37.25		
3.50-5.00% C, 57-64% Cr, 2.00-4.50% Si....	28.25		
0.025% C (Simplex) .....	39.75		
8% max C, 50-55% Cr, 6% max Si....	25.75		
4% max C, 50-55% Cr, 2% max Si....	26.50		

## High Nitrogen Ferrochrome

Low-carbon type 0.75% N. Add 5¢ per lb to regular low carbon ferrochrome max. 0.10% C price schedule.

## Chromium Metal

Per lb chromium, contained, packed, delivered, ton lots, 97.25% min. Cr, 1% max. Fe.	
0.10% max. C .....	\$1.29
9 to 11% C, 88-91% Cr, 0.75% Fe....	1.38

## Electrolytic Chromium Metal

Per lb of metal 2" x D plate (1/4" thick) delivered packed, 99.80% min. Cr. (Metallic Base) Fe 0.20 max.	
Carloads .....	\$1.15
Ton lots .....	1.17
Less ton lots .....	1.19

## Low Carbon Ferrochrome Silicon

(Cr 39-41%, Si 42-45%, C 0.05% max.) Carloads, delivered, lump, 3-in. x down, packed.			
Price is sum of contained Cr and contained Si.			
	Cr	Si	
Carloads, bulk .....	28.25	14.60	
Ton lots .....	33.50	16.05	
Less ton lots .....	35.10	17.70	

## Calcium-Silicon

Per lb of alloy, lump, delivered, packed, 30-33% Cr, 60-65% Si, 3.00 max. Fe.	
Carloads, bulk .....	24.00
Ton lots .....	27.95
Less ton lots .....	29.45

## Calcium-Manganese-Silicon

Cents per lb of alloy, lump, delivered, packed, 16-20% Ca, 14-18% Mn, 53-59% Si.	
Carloads, bulk .....	23.00
Ton lots .....	26.15
Less ton lots .....	27.15

## SMZ

Cents per pound of alloy, delivered, 60-65% Si, 5-7% Mn, 5-7% Zr, 20% Fe 1/2 in. x 12 mesh.	
Ton lots .....	21.15
Less ton lots .....	22.40

## V Foundry Alloy

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, V-5; 38-42% Cr, 17-19% Si, 8-11% Mn, packed.	
Carload lots .....	18.45
Ton lots .....	19.95
Less ton lots .....	21.20

## Graphidox No. 4

Cents per pound of alloy, f.o.b. Suspension Bridge, N. Y., freight allowed, max. St. Louis, Si 48 to 52%, Ti 9 to 11%, Ca 5 to 7%.	
Carload bulk .....	19.20
Ton lots to carload packed .....	21.15
Less ton lots .....	22.40

## Ferromanganese

Maximum base price, f.o.b., lump size, base content 74 to 76 pct Mn. Carload lots, bulk.

Producing Point		Cents per-lb
Marietta, Ashtabula, O.; Alloy, W. Va.; Sheffield, Ala.; Portland, Ore.		12.25
Johnstown, Pa.		12.25
Neville Island, Pa.		12.25
Sheridan, Pa.		12.25
Philo, Ohio		12.25
S. Duquesne		12.25
Add or subtract 0.1¢ for each 1 pct Mn above or below base content.		
Briquets, delivered, 66 pct Mn:		
Carloads, bulk .....	14.80	
Ton lots packed in bags .....	17.20	

## Spiegeleisen

Per gross ton, lump, f.o.b. Palmerton, Pa., and Neville Island, Pa.	
Manganese Silicon	
16 to 19% 3% max. ....	\$100.50
19 to 21% 3% max. ....	102.50
21 to 23% 3% max. ....	105.00

## Manganese Metal

2 in. x down, cents per pound of metal delivered.	
95.50% min. Mn, 0.2% max. C, 1% max. Si, 2.5% max. Fe.	
Carload, packed .....	45.75
Ton lots .....	47.25

## Electrolytic Manganese

F.o.b. Knoxville, Tenn., freight allowed east of Mississippi, f.o.b. Marietta, O., delivered, cents per pound.	
Carloads .....	34.00
Ton lots .....	36.00
250 to 1999 lb .....	38.00
Premium for Hydrogen-removed metal .....	0.75

## Medium Carbon Ferromanganese

Mn 80 to 85%, C 1.25 to 1.50, Si 1.50% max., carloads, lump, bulk, delivered, per lb of contained Mn .....	
	25.50

## Low-Carb Ferromanganese

Cents per pound Mn contained, lump size, packed, del'd Mn 85-90%.			
	Carloads	Ton	Less
0.07% max. C, 0.06% (Bulk) P, 90% Mn .....	37.15	39.95	41.15
0.07% max. C .....	35.10	37.90	39.10
0.10% max. C .....	34.35	37.15	38.35
0.15% max. C .....	33.60	36.40	37.60
0.30% max. C .....	32.10	34.90	36.10
0.50% max. C .....	31.60	34.40	35.60
0.75% max. C, 80.85% Mn, 5.0-7.0% Si ...	28.60	31.40	32.60

## Silicomanganese

Lump size, cents per pound of metal, 65-68% Mn, 18-20% Si, 1.5% max. C for 2% max. C, deduct 0.2¢ f.o.b. shipping point.	
Carloads bulk .....	12.80
Ton lots, packed .....	14.45
Carloads, bulk, delivered, per lb of briquet .....	15.10
Briquets, packed pallets, 2000 lb up to carloads .....	17.50

## Silvery Iron (electric furnace)

Si 15.50 to 16.00 pct., f.o.b. Keokuk, Iowa, or Wenatchee, Wash., \$106.50 gross ton, freight allowed to normal trade area. Si 15.01 to 15.50 pct, f.o.b. Niagara Falls, N. Y., \$93.00.	
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## Silicon Metal

Cents per pound contained Si, lump size, delivered, packed.		
	Ton lots	Carloads
98.25% Si, 0.50% Fe....	22.45	21.25
98% Si, 1.0% Fe .....	21.95	20.65

## Silicon Briquets

Cents per pound of briquets, bulk, delivered, 40% Si, 2 lb Si, briquets.	
Carloads, bulk .....	8.00
Ton lots, packed .....	10.80

## Electric Ferrosilicon

Cents per lb contained Si, lump, bulk, carloads, f.o.b. shipping point.			
50% Si....	14.60	75% Si....	16.90
65% Si....	15.75	85% Si....	18.60
90% Si....	20.00		

## Ferrovanadium

50-55% V delivered, per pound, contained V, in any quantity.	
Openhearth .....	3.20
Crucible .....	3.30
High speed steel .....	3.40

## Calcium Metal

Eastern zone, cents per pound of metal, delivered.			
	Cast	Turnings	Distilled
Ton lots .....	\$2.05	\$2.95	\$3.75
100 to 1999 lb. ....	2.40	3.30	4.55

Alstifer, 20% Al, 40% Si, 40% Fe, f.o.b. Suspension Bridge, N. Y., per lb.

Carloads, bulk .....	9.85¢
Ton lots .....	11.20¢

Calcium molybdate, 43.6-46.6% f.o.b. Langloeth, Pa., per pound contained Mo .....

	\$1.50
Ferrocolumbium, 58-62% Cb, 2 in. x D, delivered per pound	
Ton lots .....	\$3.45
Less ton lots .....	3.50

Ferro-tantalum-columbium, 20% Ta, 40% Cb, 0.30% C, del'd ton lots, 2-in. x D per lb con't Cb plus Ta .....

	\$3.40
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Ferromolybdenum, 55-75%, 200-lb containers, f.o.b. Langloeth, Pa., per pound contained Mo..

	\$1.76
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Ferrophosphorus, electric, 23-26%, car lots, f.o.b. Siglo, Mt. Pleasant, Tenn., \$5.00 unitage, per gross ton .....

	\$120.00
10 tons to less carload .....	\$131.00

Ferrotitanium, 40% regular grade 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti .....

	\$1.35
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Ferrotitanium, 25% low carbon, 0.10% C max., f.o.b. Niagara Falls, N. Y., and Cambridge, O., freight allowed, ton lots, per lb contained Ti .....

	\$1.50
Less ton lots .....	\$1.54

Ferrotitanium, 15 to 18% high carbon, f.o.b. Niagara Falls, N. Y., freight allowed, carload per net ton .....

	\$255.00
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Ferrotungsten, 1/4 x down packed, per pounds contained W, ton lots delivered .....

	\$2.15 (nominal)
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Molybde oxide, briquets per lb contained Mo, f.o.b. Langloeth, Pa. ....

	\$1.49
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Simanal, 20% Si, 20% Mn, 20% Al, f.o.b. Philo, Ohio, freight allowed per lb.

Carload, bulk lump .....	18.50¢
Ton lots, packed lump .....	20.50¢
Less ton lots .....	21.00¢

Vanadium oxide, 86-89% V<sub>2</sub>O<sub>5</sub> per pound contained V<sub>2</sub>O<sub>5</sub> ..

	\$1.38
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Zirconium silicon, per lb of alloy 35-40% del'd, carloads, bulk, 12-15% del'd lump, bulk, carloads .....

	\$2.25¢
	\$2.25¢

Boron Agents

Borosil, per lb of alloy del. f.o.b. Philo, Ohio, freight allowed, B 3-4%, Si 40-45%, per lb contained B

2000 lb carload .....	\$5.50
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Ferro Zirconium Boron, Zr 50% to 60%, B 0.8% to 1.0%, Si 8% max., C 8% max., Fe balance, f.o.b. Niagara Falls, New York, freight allowed, in any quantity per pound .....

	30¢
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Corbortum, Ti 15-21%, B 1-2%, Si 2-4%, Al 1-2%, C 4-5-7.5%, f.o.b. Suspension Bridge, N. Y., freight allowed.

Ton lots per pound .....	18.25¢
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Ferroboron, 17.50 min. B, 1.50% max. Si, 0.50% max. Al, 0.50% max. C, 1 in. x D, ton lots.

	\$1.20
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F.o.b. Wash., Pa., Niagara Falls, N. Y., delivered 100 lb up

10 to 14% B .....	.85
14 to 19% B .....	1.20
19% min. B .....	1.50

Graninal, f.o.b. Cambridge, O., freight allowed, 100 lb and over

No. 1 .....	\$1.05
No. 79 .....	\$0.95

Manganese-Boron, 75.00% Mn, 17.50% B, 5% max. Fe, 1.50% max. Si, 3.00% max. C, 2 in. x D, del'd.

Ton lots (packed) .....	\$1.46
Less ton lots (packed) ....	1.57

Nickel-Boron, 15-18% B, 1.00% max. Al, 1.50% max. Si, 0.50% max. C, 3.00% max. Fe, balance Ni, del'd less ton lots .....

	2.15
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(Effective Nov. 9, 1959)

## ELECTRICAL POWER EQUIPMENT IN STOCK DC MOTORS

Qu.	H.P.	Make	Type	Volts	RPM
1	3900	New Elliott	Enc. F.V.	475	320
1	2900	New Whse.	Enc. F.V.	525	600
2	2700	G.E.	MCF	415	280
1	2250	New Elliott	Enc. F.V.	600	200/300
2	2200	G.E.	MCF	400	400/500
2	2000	G.E.	MCF	350	220/350
2	1750	G.E.	MCF	250	175/350
4	1500	New Whse.	Enc. F.V.	525	600
2	1400	G.E.	MCF	250	165/300
1	1300	G.E.	MCF-12	300	300/400
1	1200	G.E.	MCF	600	450/800
1	1000	Whse.	QM	500	800/2000
1	940	Whse.	Enc. F.V.	250	140/170
2	800	G.E.	MCF	250	400/750
3	785	Allia. Ch.	MHC	550	1012/1350
2	750	G.E.	MCF	600	450/900
1	750	G.E.	M.F.	600	120/300
4	600	Whse.		250	275/550
2	500	G.E.	MFC-10	250	180/400
2	450	Whse.		250	415
2	400	G.E.	CY-275	300	1000/1500
2	325	Allia. Ch.	MHC	250	450/900
1	300	Cr. Wh.	H-100 B.B.	330	1200
1	200	Raj. B.B.	T-664-D.P.	240	520
1	300	Whse.	CB-207-4	250	850/1200
1	150	Cr. Wh.	CMC-65H	230	1150
1	150	G.E.B.B.	TLC-74	250	1150/2500
1	150	G.E.B.B.	CD	600	250/750
1	150	G.E.	CDP-123, B.B.	250	1750
1	150	A.C.	E.V.R.B.	250	450/1200
1	120	G.E.B.B.	TLC-50	250	1950/5000
1	120	Raj. B.B.	1050T	230	575/900
1	100	Whse.	SK-140	220	450/1100
1	100	G.E.	CDP-145	230	1750
1	80	Whse.	SK-123-9	240	2000/4500
1	75	G.E.B.B.	CD-1235-D.P.	600	850
1	60/75	Raj.	1050T	250	350/1050
1	60/40	Whse. B.B.	SK-131, TEFC	250	500/1050

## MERCURY ARC RECTIFIERS

- 2-150 KW, G.E., Sealed Tube Ignitron Unit Substation load centers 275 V. D.C., 2300 V. A.C. Pyranol filled transformers complete.
- 2-150 KW, G.E., Ignitron, 245 V. D.C.—230 V. A.C. air cooler transformers with controls.

## MG SETS—3 Ph. 60 CY.

Qu.	K.W.	Make	RPM	DC Volts	AC Volts
1	2000	G.E.	514	600	2300/4000
2	1750/2100	G.E.	514	250/300	2300/4000
1	1700	G.E.	514	600	2300/4000
1	1500	G.E.	720	600	6000/13200
1	1500	Cr. Wh.	4 unit	720	100
1	500	G.O.	900	125/250	2300
1	500	G.G.	800	250	440
1	500	G.E.	1200	300	2300/4000
1	350	G.E.	900	125	440/2300/4100
1	300	G.E.	1200	250	2300/4000
1	300	G.E.	1200	250	440/2300
1	250	G.E.	900	125	440/2300
1	240	Whse.	900	125	220/440
1	200	Whse.	1200	510	2200
1	200	El. Mhy.	1200	250	2300/4000
1	150	G.E.	1200	275	2300
1	150	Whse.	1200	275	2300
1	500	G.E.	1200	250	440
1	500	G.E.	1200	125	440
1	100	Cr. Wh.	600	125/250	2300
1	100	G.E.	1170	250	230/440
1	100	Cr. Wh.	81100	525	220/550
1	100	G.E.	1200	250	2400/4100
2	75	Whse.	1200	125	440

## TRANSFORMERS

Qu.	KVA	Make	Type	Ph.	Voltages
2	3333	Whse.	OISC	1	13800 x 2300
2	1000	G.E.	CA/FA	1	13800 x 230/400
2	833	A.C.	OISC	1	4800/2400 x 480
2	750	Wagner	JPC-16	3	13200 x 480
2	750	G.E.	Pyranol	1	4800x25/95-255/185
2	500	Kuhl	OISC	1	18200 x 4000
2	150	G.E.	OISC	1	33000x2300/4000Y
2	100	G.E.	HS	1	4800/3300Y x 120/240

## CRANE & MILL MOTORS

Qu.	H.P.	Make	RPM	Type
12	12/14	Whse.	700/600	MCA-30, Series
1	20	Whse.	975	K-5 Series
1	25	G.E.	975	MDA-400
1	35	Whse.	480	CK-9 Comp. S.B.
1	35	Whse.	480	CK-9 R.R. S.B.
1	45	Whse.	600	CK-9 Comp. S.B.
1	50	G.E.	450	COM-1830 Comp.
1	50	Whse.	525	CK-9 R.R. S.B.
1	50	Whse.	800	CK-9 Comp. R.R.
1	80	G.E.	525	COM-1830AEB.R.
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## THE CLEARING HOUSE

# Like Others, Detroit Dealers Feel Pinch

Used machine dealers in Detroit are reporting few sales and are blaming the slowdown on the steel strike.

Auctions are well attended, but company representatives are outbidding dealers.

The steel strike is giving many of Detroit's larger industrial companies an excuse to delay investing in machine equipment.

"We go out and talk to the big customers," says an exasperated used machinery dealer. "They shake their heads and tell us, 'Sorry, things are too uncertain right now. Come back when the strike is settled.'"

The Steel Mixup—"We tell ourselves maybe these guys wouldn't buy anything even if there wasn't a steel strike," says the dealer. "But when we get the same story from everybody, we have to figure the steel mixup is hurting business."

Despite the steel "mixup" and its adverse effects in this area, October sales of used machines were fair—not too good, but not too bad. But with many Michigan auto companies and their parts suppliers already shut down for indefinite periods the outlook for the rest of the year is a bit dimmer.

Far and Few—Much of the buying these days is being done by the fellow with the small machine shop, employing not more than a few men. He is scouting around for grinders and lathes, particularly. Next in attracting interest are

presses, square shears and brakes. Orders from the once powerful tool and die trade are now few and far between in Detroit.

Today there is an abundance of all types of equipment. Warehouses are full of every kind of machine. And customers are very choosy.

Auctions in the area are well attended. "The good machinery goes quickly," reports an auctioneer who handled a late October auction of presses, milling machines and miscellaneous tool room goods. "Prices are strong for first rate stuff. But machines that are in poor or mediocre shape are hard to get rid of. Prices for this equipment are going down, down, down. People are really shopping hard for top notch used machines and they are willing to pay good prices for them."

Prices Steady—Still, prices have not fluctuated much this year. There is no talk of any sudden price swing, either. One dealer says, however, that he has had to put in some pretty steep bids at auctions lately. "You go to this place where they've got a sale," he says. "You figure your bid is fair and you've got a good chance of landing a piece of machinery. Then you find out you're not even close to the eventual selling price."

Auctioneers explain the dealer's problem this way. They say that auctions are getting broader advertising these days. They are attracting not only dealers, but machinery users. The user can overbid the dealer who must hold down his offer in order to allow for a margin of profit on the resale.

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10 ton Whiting	75' Span 220/3/60 A.C.
10 ton Shaw	128' Span 220 Volt D.C.
15 ton Milwaukee	56' Span 440/2/60 A.C.
15 ton Shepard Niles	55' 6" Span 220/3/60
20 ton P&H	57' 6" Span 220/3/60
20 ton Shaw	70' Span 220 Volt D.C.
120 ton Niles	47' Span 220 Volt D.C.
120 ton Shepard Niles	77' Span 220/3/60 A.C.

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### Fabricating Plant Superintendent

Should be experienced in all welding methods and work layout with particular reference to code work on stainless steels. A medium sized shop located in the Middle West. Advise past experience, present employment, and salary desired.

BOX G-966

c/o The IRON AGE, Chestnut at 56th, Phila. 39

SALES-ENGINEERING Position. College degree in Engineering, preferably in Metallurgy, with sales inclination or experience. Position involves sales and engineering problems in metallurgy, heat treatment and metal finishing in and around the Philadelphia Area. Salary commensurate with experience, plus expense account and use of company car. Send complete resume to

BOX G-965

c/o The IRON AGE, Chestnut at 56th, Phila. 39



## OPPORTUNITIES IN PRODUCTION METALLURGY E. I. DU PONT DE NEMOURS & COMPANY

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Trained personnel in physical and mechanical metallurgy or those with equivalent experience are needed for these supervisory openings. Please forward résumé, including details of education, experience and salary expected to Mr. A. F. Hartford, Employee Relations Department, E. I. du Pont de Nemours & Company, Wilmington, Delaware. Replies held confidential.

## METALLURGIST

Experience in non-ferrous foundry operation preferred. Salary open. Excellent opportunity. Send resume to

BOX G-961

c/o The IRON AGE, Chestnut at 56th, Phila. 39

### Opening for Qualified Personnel

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BOX G-964

c/o The IRON AGE, Chestnut at 56th, Phila. 39

## TECHNICAL SALES

Technical sales position with large metal company in the heat and corrosion resistant alloy field. Engineering degree preferred. Opportunity includes thorough mill training program. Submit resume with application.

BOX G-963

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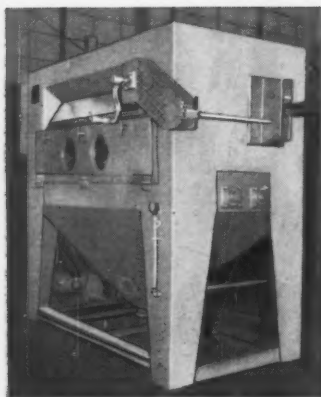
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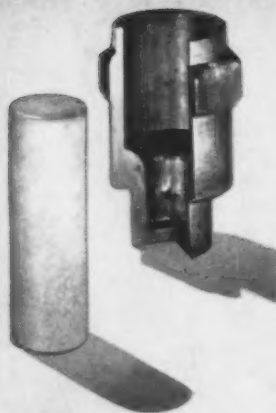
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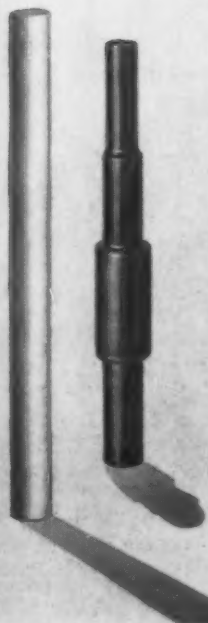
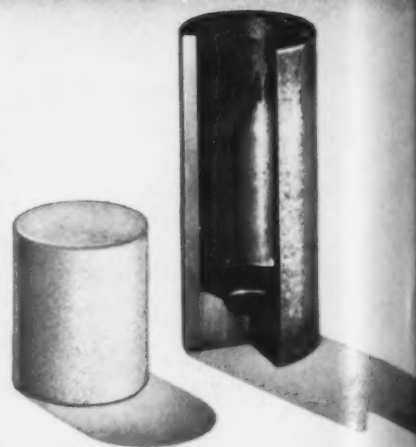


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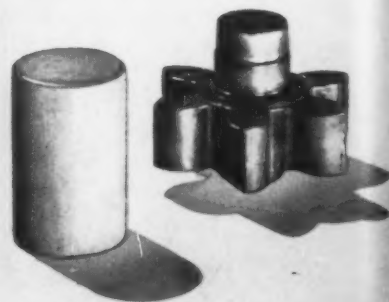


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